# TELEPHONE ENGINEER

MANAGEMENT • ENGINEERING • MAINTENANCE

**NOVEMBER 1936**

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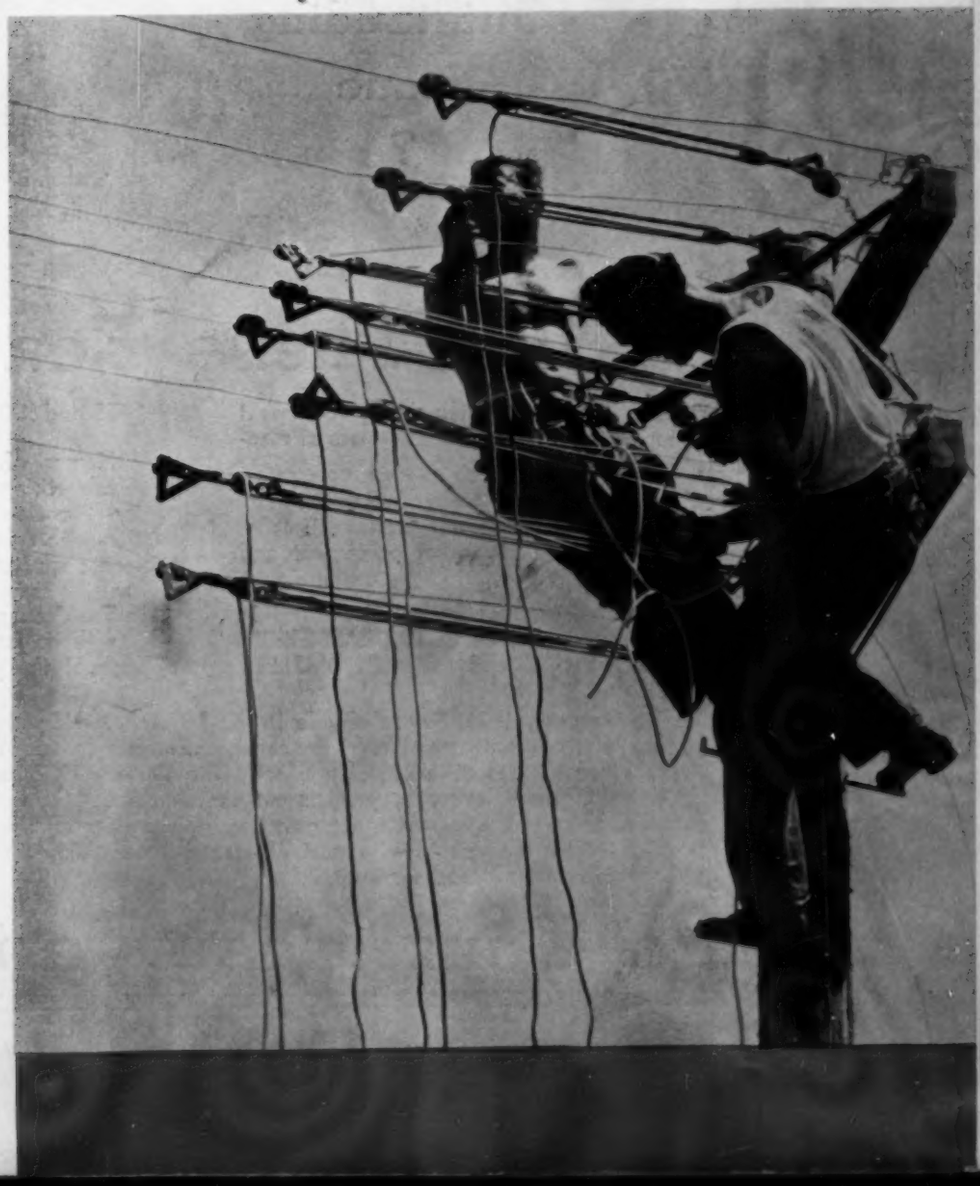

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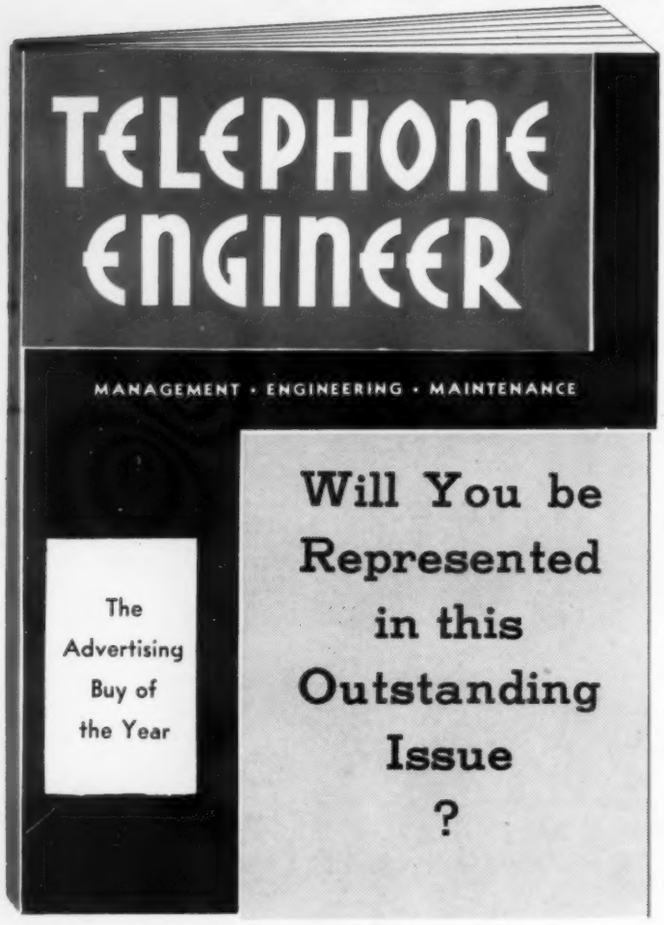
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NOVEMBER, 1936

# "Tapping In" On Washington

By ROLAND C. DAVIES
Editor
Telecommunications Reports

● With the reelection of President Roosevelt, the Federal Communications Commission is now engaged in the planning of its future program of regulation over the telephone industry which will undoubtedly tend to strengthen and probably expand its jurisdiction and powers. The second term of the "New Deal', it is a foregone conclusion, will produce a greater concentration of utility regulation in Washington than has existed heretofore.

What new steps in telephone regulation will be mapped out remains a secret and probably will not be disclosed until the opening of Congress when the FCC transmits to Capitol Hill its legislative recommendations. However, an inkling of this program has been given in the fact that the FCC has submitted a budget estimate for the next fiscal year, commencing July 1, 1937, which will call for an increased appropriation of $500,000 for telephone regulation. This increase in funds is designed to enable the FCC to expand its telephone accounting and engineering forces and, especially, to establish large accounting field offices in various regions of the United States.

President Roosevelt has not yet given any inkling of his views on enlarged Federal telephone regulation. It is not thought that he desires any concerted attack upon the telephone industry such as has been directed against the electric power utilities. But the Chief Executive is known to favor strong and constructive regulation of the telephone industry, because he has often expressed the view that any national monopoly should be well-regulated in the public interest.

● However, it is regarded as significant by Washington observers that President Roosevelt in his reelection campaign made no mention of the telephone industry although on several occasions he promised the electorate he would seek further reduction of power and transportation rates. It is also believed likely that the Chief Executive and the Budget Bureau in their attempts to cut down Federal spending may not desire to grant such a large increase as $500,000 to the FCC for their next year's appropriation.

The two Congressional committees, handling communications legislation, the Senate and House Interstate Commerce Committees, will be greatly changed in the new Congress convening Jan. 5.

On the Senate side the loss of Republican Senators was heavy. Senator Couzens of Michigan died after he had been defeated in the primary and the next two ranking Republicans, Metcalf of Rhode Island and Hastings of Delaware, were losers in the November election. This means that Senator Wallace H. White Jr. of Maine, who is rated as the leading authority on communications in Congress, will become the ranking Republican on the committee. Senator Vandenburg of Michigan, who was the center of a controversy because of his broadcasting of records of President Roosevelt's address in a radio interview, is being talked of as a new member of the committee. Senator Wheeler of Montana will continue as chairman.

On the House side Chairman Rayburn may seek the post of speaker or majority leader which would mean the elevation of Representative Lea of California to the chairmanship. There are three Democratic vacancies due to defeat of Representatives in primaries or withdrawal from Congress and three Republicans lost in the election. Representative Mapes of Michigan now becomes the ranking Republican due to the election shakeup.

• • •

## *Accounting System Case and Telephone Investigation Hearings . . .*

● The two events of immediate interest, which appear to be the most important to the telephone industry, will be the decision of the United States Supreme Court on the FCC Uniform System of Accounts for Telephone Companies and the resumption of the Telephone Investigation hearings.

The Supreme Court scheduled arguments on the accounting system case during mid-November and heard presentations from former Attorney General William D. Mitchell for the American Telephone and Telegraph Co. and Bell System and Alden T. Klots for the companies in the General Telephone group. The argument for the Federal government and the FCC was delivered by John Dickinson, first assistant attorney gen-

eral of the United States, while John E. Benton, general solicitor of the National Association of Railroad and Utilities Commissioners, presented the views of the state regulatory agencies. The Supreme Court may hand down its decision during the latter part of December so that, if the FCC was victorious, the new system would become effective Jan. 1, 1937. However, it is rather likely that the finding will not come until January as usually 60 days elapse between argument and decision in the deliberations of the nation's highest tribunal.

● The long-expected resumption of hearings in the Telephone Investigation is slated for the first week in December At that time the general phase of the Investigation will be pursued and Acting Special Counsel Samuel Becker is expected to delve further into the non-telephonic activities and enterprises of the American Telephone and Telegraph Co., conducted in sound film equipment through its Electrical Research Products Inc. License contracts of the Bell System companies with the A. T. & T. parent company will be another subject. At a later date it is understood the manufacturing and engineering practices of the Bell System will be taken up which will endeavor to bring out the progress shown by independent telephone manufacturing companies in certain lines of equipment. The toll rate investigation under the direction of Carl I. Wheat will probably not start until most of the general side of the investigation is completed.

• ● •

## *State Commissions Oppose Expansion of FCC Powers . . .*

● Because of the very great predominance of local exchange and intrastate service in the telephone business, state utility commissioners at the annual meeting of their national association at Atlantic City, N. J., during the second week of November stressed their position that all phases of telephone regulation, except over soley interstate operating carriers and service, came within the authority of the states and that the FCC should confine its activities to the interstate side exclusively.

One important view came on the FCC's power to fix telephone depreciation rates and Chairman E. J. Hopple of the Ohio Public Utilities Commission in a report to the association declared that the Federal Commission should relinquish this regulatory function to the state commissions with the exception of fixing the depreciation charges for the Long Lines Department of the American Telephone and Telegraph Co. He took the stand that state commissions, because of their knowledge and previous study of local operating conditions and plant problems in the case of climate and terrain, could administer depreciation rates with far greater efficacy and constructive accomplishment, both in the interest of the telephone subscribers and to preserve the telephone plant for good service and in the interest of the investors, than a centralized authority in the National Capital.

● The Ohio Commission chairman proposed the FCC should make a recommendation to the next Congress that the mandatory provision (Section 220 [b]) in the Communications Act for the fixing of depreciation rates for all telephone carriers subject to the Federal jurisdiction be eliminated. This would mean that the state commissions would have the power to fix depreciation charges for the intrastate business of all telephone carriers, while the FCC would establish those rates for the plant used in interstate service, practically all of it belonging to the A. T. & T. Long Lines Department.

Another important discussion of FCC power was given in a report by Commissioner Floyd Bollen of Nebraska who felt that Section 2 (b) (2) of the Communications Act in regard to the scope of the authority of the FCC over Independent telephone companies was still confused and needed clarification. One thought was expressed by Chairman E. J. Goodnough of the Pennsylvania Commission that even for carriers subject to the entire provisions of the Communications Act certain regulatory powers, such as over management, license contracts, valuations and mergers, should not be assummed by the FCC because of the almost entire proportion of intrastate traffic.

A different viewpoint was taken by Commissioner William H. Barry of New Hampshire, who, while he thought the state commissions should guard their regulatory rights, believed it was "playing into the hands of the utilities" for a conflict to appear between the Federal and state regulatory agencies. He felt that both bodies could work on a common front and accomplish much benefit for the public. Another expression during the general debate on Federal-state cooperation came with the idea of several commissioners that the personnnel of Federal commissions in the future would be mainly recruited from state commission ranks. Chairman Paul A. Walker of the FCC Telephone Division in a brief address at the association banquet pledged cooperation with the state bodies by the Communications Commission.

● "Regulation must take into consideration and have knowledge of local requirements and conditions," Chairman Hopple stated in his report on FCC depreciation powers. "It is not such a simple process as applying a yardstick formula. State commissions are intimately acquainted with local requirements, while a Federal agency would be far removed from the scene and would not have firsthand knowledge of local conditions. Therefore, either it would have to duplicate to a large extent the functions of the state commissions by setting up large field staffs or could not give due consideration to local factors." The Ohio Commission head pointed out that depreciation was the second largest item of operating expense, amounting to 20 per cent of the operating revenues, and that depreciation charges in many instances were the deciding factor in fixing rates. He cited that a small difference in the depreciation rate may mean the difference between confiscatory earnings and earnings in excess of a fair return and noted that the telephone business required a heavy investment in plant usually four or five times as great as the annual revenues from service and depreciation charges take a large share of these revenues.

● Two important utility regulatory officials felt the courts, including the U. S. Supreme Court, had hampered rate regulation with their failure to establish a definite yardstick to measure the rate base. Dean Frank H. Sommer of the New York University Law School and general counsel of the New Jersey Commission, believed that "prudent investment cost" was the best test for establishing a rate base, while Commissioner Clyde L. Seavey of the Federal Power Commission felt "historical, or original, cost" provided the real basis of representing the definite investment in property. Both officials condemned the use of "reproduction cost" as time-consuming and costly to regulatory bodies and as responsible for much of the delay in rate regulation. Dean Sommer also proposed that utility stockholders should bear the expense of unwarranted court tests by utilities rather than such ex-

(Please turn to page 31)

### CONVENTION SCHEDULE

**Minnesota Telephone Association, Hotel Lowry, St. Paul, January 19, 20 and 21.**

**Nebraska Telephone Association, Hotel Lincoln, Lincoln, Neb., February 9 and 10, 1937.**

**Indiana Telephone Association, Claypool Hotel, Indianapolis, May 11 and 12, 1937.**

# Telephone Transmission
## Theory and Practice

By ROBERT A. CLARK, JR.

## CHAPTER X

**The transmission characteristics of telephone lines and equipment is discussed in this chapter. Methods of loading cables are described. Calculations of circuit equivalents are shown.**

● We come now to a discussion of line and equipment characteristics which affect telephone transmission and which determine the distances over which conversation may be had. In Chapter IX we discussed the characteristics of transmitters and receivers and listed transmission limits for reasonably good telephone conversations. You will also recall that in Chapters V and VI we discussed the theory of telephone transmission and the methods of measurement and that good telephone transmission would be had on circuits having equivalents not exceeding about 20 db.

The method of computing transmission losses between two telephones is of great importance to all who have the problem of providing and maintaining long distance telephone circuits. As mentioned previously we generally compute the 1,000 cycles loss assuming it represents the equivalent of a circuit. Actually, the loss will vary somewhat within the voice limits of 200 and 2,000 cycles; however, in general, the characteristics are such that if the 1,000 cycle equivalent is within the limits of 20 db, the talking characteristics will be satisfactory. There are a few cases as in broadcasting circuits in which the characteristics over the entire voice range are desired and by using the same method of calculation as for the 1,000 cycle, the equivalent at any other frequency may be determined.

● In order to compute the overall loss on a circuit, the losses in each component must be known. The tables which follow present a fairly complete picture of the transmission equivalents of commonly used open wire and cable circuits, and telephone equipment. Table 13 shows the 1,000 cycle transmission equivalent of open wire together with the characteristic impedance of which we will discuss in more detail in a later chapter. Table 14 shows the transmission equivalent of telephone cable together with the characteristic impedance. The equivalents of miscellaneous equipment used in connection with long distance circuits is shown in Table 15.

The procedure which we use in computing the equivalent of a telephone circuit was briefly mentioned in Chapters V and VI. The unit of transmission loss (the decibel) was so chosen that the total loss on a circuit could

**TABLE 13**
**Transmission Equivalents of Metallic Open-wire Circuits**

| Circuit | 1000 cycle DB per mi. | 1000 cycle Z ohms |
|---|---|---|
| 8 B.W.G. Copper Physical | 0.031 | 620 |
| 8 A.W.G. Copper Physical | 0.048 | 650 |
| 9 A.W.G. Copper Physical | 0.058 | 685 |
| 12 S.W.G. Copper Physical | 0.068 | 710 |
| 10 A.W.G. Copper Physical | 0.071 | 800 |
| 8 B.W.G. Copper Phantom | 0.025 | 375 |
| 8 A.W.G. Copper Phantom | 0.040 | 400 |
| 9 A.W.G. Copper Phantom | 0.048 | 410 |
| 12 S.W.G. Copper Phantom | 0.057 | 420 |
| 10 A.W.G. Copper Phantom | 0.060 | 425 |
| 4 A.W.G. Aluminum Physical | 0.033 | 625 |
| 6 A.W.G. Aluminum Physical | 0.048 | 650 |
| 8 A.W.G. Aluminum Physical | 0.070 | 800 |
| 9 A.W.G. Aluminum Physical | 0.087 | 875 |
| 6 A.W.G. Copper Clad (40%) Phys. | 0.087 | 720 |
| 8 A.W.G. Copper Clad (40%) Phys. | 0.12 | 790 |
| 9 A.W.G. Copper Clad (40%) Phys. | 0.14 | 860 |
| 10 A.W.G. Copper Clad (40%) Phys. | 0.16 | 925 |
| 6 A.W.G. Copper Clad (30%) Phys. | 0.12 | 760 |
| 8 A.W.G. Copper Clad (30%) Phys. | 0.16 | 865 |
| 9 A.W.G. Copper Clad (30%) Phys. | 0.19 | 950 |
| 10 A.W.G. Copper Clad (30%) Phys. | 0.22 | 1025 |
| 6 B.W.G. Iron (BB) | 0.16 | 1000 |
| 8 B.W.G. Iron (BB) | 0.20 | 1100 |
| 10 B.W.G. Iron (BB) | 0.23 | 1200 |
| 12 B.W.G. Iron (BB) | 0.30 | 1400 |

be found by adding together the individual losses to the elements. Likewise, the loss over a length of open wire or cable could be computed by multiplying the loss per unit length (mile) as indicated in Tables 13 and 14 by the total length of the section. For example, if we have two circuits each having a loss of 10 db which we wish to connect together the total loss over the two circuits is the sum of the losses in each or 20 db. If we have a line consisting of 100 miles of No. 9 AWG copper open wire which has an equivalent of 0.058 db per mile the total loss over the entire section would be $100 \times 0.058$ db$=$ 5.8 db.

Let us take another example of a circuit consisting of 135 miles of No. 8 AWG copper open wire at one end of which is a section consisting of five miles of 16-gauge non-loaded cable. At each terminal of the circuit there is a composite set for obtaining two d-c telegraph circuits, also a high-efficiency repeating coil. We desire to know the transmission equivalent of this combination. From Table 13 we find that the transmission loss of No. 8 AWG copper open wire is 0.048 db per mile. The loss in 135 miles would be $135 \times 0.048 = 6.48$ db. The loss in six miles of 16 gauge non-loaded cable is 0.73 db per mile (Table 14) or a total of 4.38 db. The loss in the composite sets each of which amounts to 0.70 db (Table 15) is 1.40 db. The loss in the two repeating coils each of which is 0.26 db is 0.52 db. Totalizing these losses, we have:

| | |
|---|---|
| 135 miles No. 8 AWG open wire | 6.48 db |
| Six miles No. 16 gauge paper cable | 4.38 db |
| Two composite sets | 1.40 db |
| Two repeating coils | 0.52 db |
| Total | 12.78 db |

● There is one additional loss not shown above which is known as the **transition loss** (sometimes called the **reflection loss**) and which we discussed in Chapter VII. Referring to Table 9 in Chapter VII, you will recall when lines of different characteristic impedances are connected together a loss occurs due to the difference in impedance characteristics. Such a condition occurs when the cable and open wire sections are connected together, also if the cable is connected to terminal equipment of different impedance characteristics. The impedance of the open wire (see Table 13) is 650 ohms. The impedance of the 16-guage cable is 360 ohms. The ratio of these two impedances is approximately 0.55.

**TABLE 14**
**Transmission Equivalents of Loaded and Non-loaded Cable**

| Circuit | 1000 cycle DB per mi. | 1000 cycle Z ohms |
|---|---|---|
| 19 ga. Paper Physical, Non-loaded | 1.09 | 510 |
| 16 ga. Paper Physical, Non-loaded | 0.68 | 360 |
| 13 ga. Paper Physical, Non-loaded | 0.47 | 270 |
| 19 ga. Paper Phantom Non-loaded | 0.94 | 300 |
| 16 ga. Paper Phantom Non-loaded | 0.60 | 210 |
| 13 ga. Paper Phantom Non-loaded | 0.41 | 150 |
| 19 ga. Latox Rubber Physical Non-loaded | 1.54 | 370 |
| 16 ga. Latox Rubber Physical Non-loaded | 1.12 | 250 |
| 13 ga. Latox Rubber Physical Non-loaded | 0.89 | 180 |
| 19 ga. Paper Physical 28 mh loaded | 0.56 | 650 |
| 16 ga. Paper Physical 28 mh loaded | 0.29 | 650 |
| 13 ga. Paper Physical 28 mh loaded | 0.16 | 650 |
| 19 ga. Paper Phantom 16 mh loaded | 0.47 | 400 |
| 16 ga. Paper Phantom 16 mh loaded | 0.24 | 400 |
| 13 ga. Paper Phantom 16 mh loaded | 0.13 | 400 |

**TABLE 15**
**Transmission Equivalents of Telephone Apparatus**

| | DB Side | DB Phantom |
|---|---|---|
| Repeating coil, high efficiency on side circuit | 0.25 | 0.20 |
| Repeating coil, high efficiency on phantom circut | | 0.30 |
| Repeating coil, standard on side circuit | 0.65 | 0.25 |
| Repeating coil, standard on phantom circuit | | 0.70 |
| Repeating coil, high impedance on side circuit, 1 coil | 1.5 | |
| Repeating coil, high impedance on side circuit, 2 coils | 3.0 | |
| Composite set | 0.5 | 0.5 |
| Heat coils (2 in circuit) average | 0.5 | 0.3 |

From Table 9 we find that the loss to this mismatch is approximately 0.3 db. The loss could be eliminated at the terminal by the use of a proper matching transformer. However, it is impractical to eliminate the loss at the open wire junction without resorting to the installation of loading coils to bring the impedance of the cable up to the same value as the open wire. The transition loss is generally small and is generally neglected. However, it should be considered where exact measurements are being made.

The transmission equivalents shown in Tables 13 and 14 are based on temperature conditions of approximately 60°F. and negligible leakage resistance. These values will hold true on open wire lines during average temperature and clear weather. The insulation resistance of cable circuits is obviously high under all weather conditions. You will find that temperature and leakage will effect the transmission equivalents to a considerable degree. On a hot day the effect of high temperature may increase the transmission equivalent on open wire and aerial cable circuits by as much as 15 or 20 per cent. Likewise, on a cold day, reduction in equivalent of the same order may be expected. The effect of insulation resistance on the transmission equivalents of open wire circuits is somewhat greater then that of temperature changes. Under conditions of very low insulation resistance, the transmission loss may increase as much as 50 per cent of the nominal value. Therefore in designing circuits these factors should be considered so that adequate margin will be had for extreme weather and temperature conditions.

Figure 53 shows typical transmission-frequency characteristics of both open wire and cable circuits. It is of interest to note that the losses on iron wire circuits rise very rapidly with frequency. For this reason, iron wire is not highly suitable for long telephone circuits. However, telephone repeaters can be so designed that the gain-frequency characteristics partially compensate for the increased losses thus flattening out the overall transmission-frequency characteristics.

● Most of you are familiar with the fact that the losses in telephone cable can be materially reduced by the installation of so called **loading coils.** These coils are installed at intervals along the cable and in effect, neutralize the capacity between the wires. You will note from Table 14 that by the

use of loading coils having an inductance of 28 millihenries and spaced at intervals of approximately one mile, the transmission loss on 19-guage paper cable can be reduced from 1.09 db per mile to 0.56 db per mile. This size loading coil when installed on cable circuits at intervals of approximately one mile results in a cable circuit having impedance characteristics very similar to that of open wire. Larger size coils will permit reducing the transmission equivalents still further; however, owing to the fact that most cables are used in conjunction with open wire circuits the 28 millihenry loading is in general the most desirable.

There are certain other factors of importance in the loading of cables beside the transmission equivalent; one is the **impedance,** of which we have already spoken, the other is the so-called **cut-off frequency.** When a cable circuit is loaded with coils spaced at a uniform distance apart, we find that the transmission characteristics are fairly constant from 200 cycles up to a certain frequency; above this the transmission loss increases very rapidly. This point at which the transmission loss begins to rise is known as the **cut off frequency.** Obviously the cut off frequency should be sufficiently high so that all frequencies in the voice band are attenuated the same amount. The cut off frequency is given by the formula

$$F_c = \frac{1}{\pi \sqrt{LC \times 10^{-9}}} \qquad (35)$$

Where $F_c$ is the cut off frequency in cycles per second, L is the inductance of the loading coil in mh. and C is the capacity of the cable in mf. between loading points. We find that the cut off frequency for a paper cable circuit loaded with 28 millihenry coils spaced approximately one mile apart will be about 7,600 cycles. This is well above the voice range and the transmission characteristics as you will note from Fig. 53, are quite uniform.

● The characteristic impedance of a loaded cable is given by the formula

$$Z = \sqrt{\frac{L}{C}} \times 10^3 \qquad (36)$$

Where Z is the characteristic impedance of the cable circuit in ohms, L is the inductance of the loading coils in mh. and C the capacity in mf. of the cable between the loading points.

As you will learn later in following chapters, sections of non-loaded cable in open wire circuits tend to reduce the possible gain or amplification which can be obtained with telephone repeaters. This is due to the fact that the difference in impedance between the non-loaded cable and the open wire

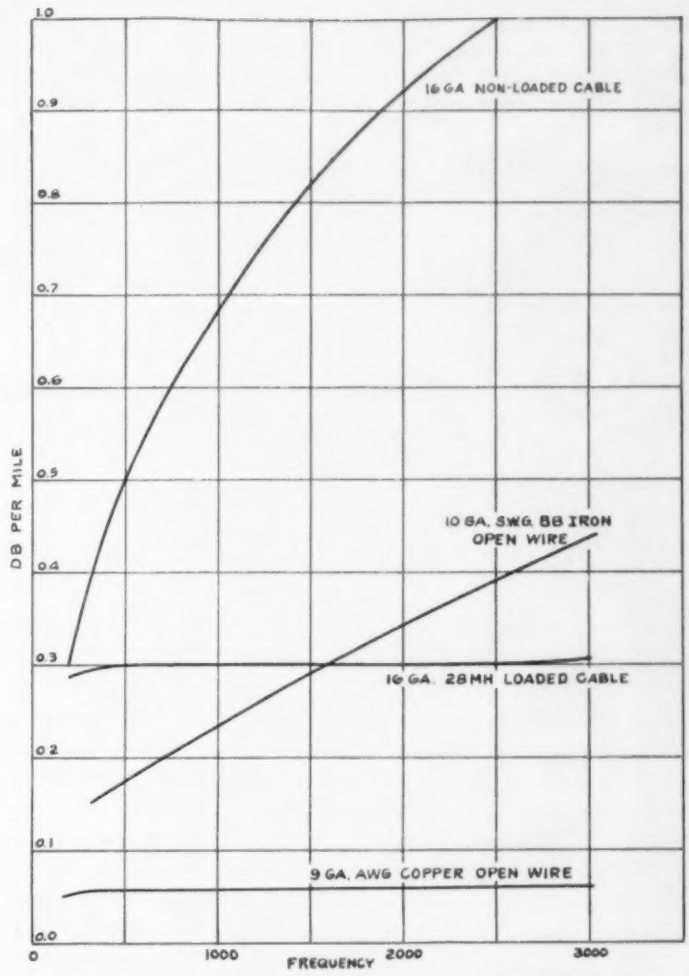


**Fig. 53—Transmission frequency characteristics of typical cable and open wire circuits.**

causes what is known as **irregularities** in the impedance characteristics of the open wire circuit. In order to eliminate these irregularities it is necessary to install loading coils in the cable sections such that the cable impedance matches that of the open wire.

While the theory of loading is rather involved, I will attempt to give you a brief summary of the problem and illustrate the method used to lay out loading for short sections of cable occuring in open wire lines. The first essential is that the characteristic impedance of the loaded cable be equal to that of the open wire. Second, the spacing between the load points must be uniform with a few percent, say two to four. The cable should be divided into sections such that at each end the cable capacity is one-half that between the loading points. An alternative to this is to use what is known as half-loading coils at the junction of the cable and open wire; these are one-half the inductance of the coils used in the sections. An illustration of these two examples is as follows. Suppose we have a section of cable two miles in length. We wish to install loading so that the distance between load points is one mile. Using the first method we would divided the two mile sections into three parts as follows. Starting at one end which we will consider the "A" cable terminal, we would measure a distance of one-half mile and locate the first loading point. Then we would measure a distance of one mile and locate the second loading point, thus leaving a distance of one-half mile from the second load point to the other cable terminal, "B". This requires two loading coils for a pair of wires and obviously necessitates opening the cable at two points.

● Now if we were to load the cable at the terminals with half-loading coils we would locate a half-coil at terminal "A" then measure a distance of one mile where a full size loading coil would be located. This would leave a distance of one mile to terminal "B" where we would locate another half-loading coil. This procedure would require three loading coils for a circuit but would necessitate opening the cable at only one point. Where short sections of cable are involved, say about one mile or less in length, it

is possible to install loading coils only at the terminals and obtain the desired characteristics. You will note from equation 36 that the impedance is a function of the capacity between load points which in turn depends upon the type of cable and its capacity per mile. Paper cable ranges from about .060 to 0.075 mf per mile. Latox rubber cable averages about 0.15 mf per mile.

The cut off frequency should in general be kept above 5,000 cycles. This will permit a high degree of balance to be maintained on long repeatered open wire circuits. A rapid method of determining the size of load coils for cable sections of different capacity is had by use of the curves shown in Fig. 54; these are prepared from the equations (35) and (36) and provide a cable circuit which will match an open wire line having an impedance around 680 ohms. This is sufficiently close to the commonly used open wire circuits so that an adequate match will be had. In using the curve it is necessary to know the total length of cable and its capacity per mile.

Where phantom circuits are involved the procedure is the same in the case of physical circuits. Phantom coils can also be installed at the cable terminal using the same principle as applied to the physical circuit. Fig. 55 shows the method of connecting loading coils on both the physical circuit and on a phantom group; the coils on the phantom group load both side circuits and the phantom. The figure shows one-half loading coils at the terminals of the cable and one set of full size loading coils intermediate.

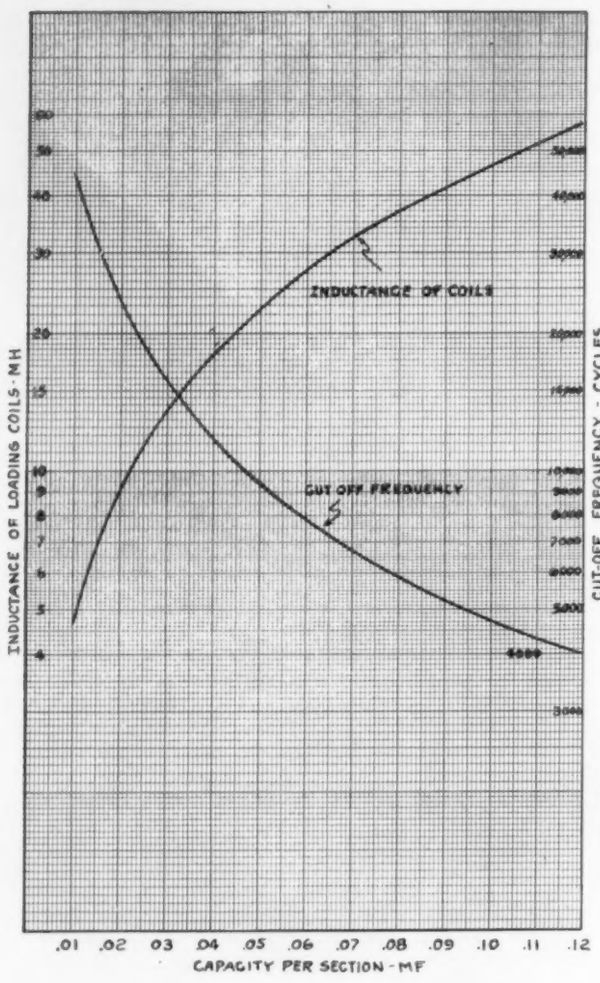
INDUCTANCE OF LOADING COILS - MH
INDUCTANCE OF COILS
CUT OFF FREQUENCY
CUT-OFF FREQUENCY - CYCLES.
.01 .02 .03 .04 .05 .06 .07 .08 .09 .10 .11 .12
CAPACITY PER SECTION - MF

Fig. 54. Curves for use in designing cable loading to match open wire lines.

(TO BE CONTINUED)

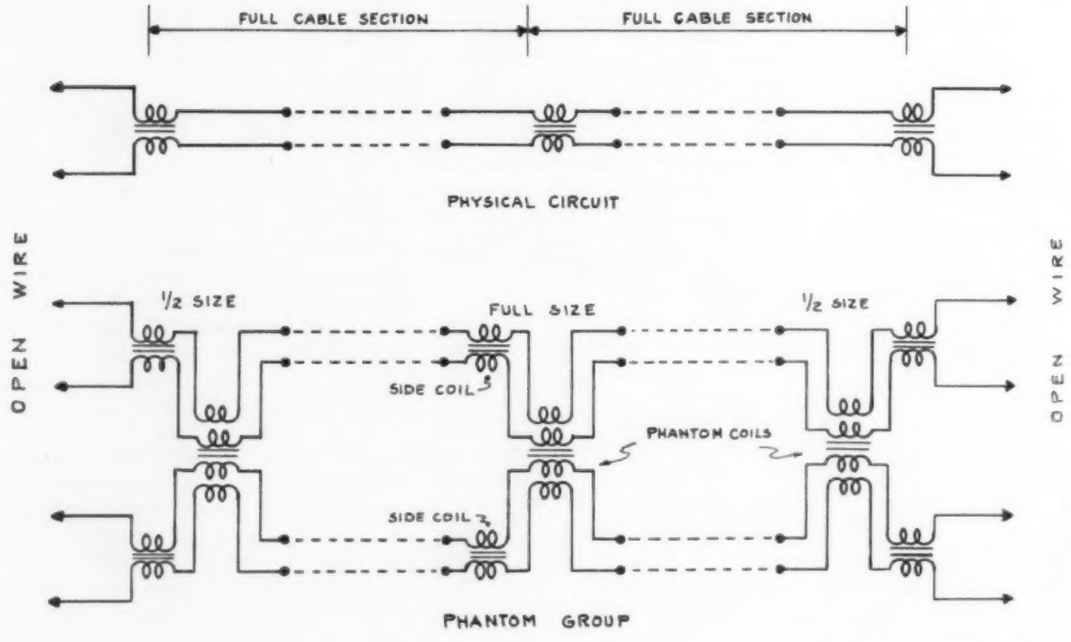


Fig. 55. Schematic wiring of physical and phantom group loading on cable, half-coils installed at junction of cable and open wire.

# Value-of-the-service Factor in Utility Rate Making

By GEORGE J. EBERLE
Eberle Economic Service, Ltd.
Los Angeles, California

## PART I

**The consideration of the value of utility service as an artificial limitation upon utility charges has received some emphasis during the depression in cases before public service commissions, on the theory apparently that utilities should not be permitted to charge more than the value of the service as determined by the commissions, irrespective of the effect on the company's revenues. On the other hand, value of this service has been urged as a reason for increasing rates in some instances. This is the first of a series of three articles on the value-of-the-service factor in pricing utility service. These articles appeared in PUBLIC UTILITIES FORTNIGHTLY and are reprinted through the courtesy of that publication.**

● Never during the past thirty years of intensive rate regulation has there been such an insistent and widespread demand to emphasize the value of service concept as a basis for pricing utility service to the consumer as has existed during the recent major depression period. In many cases, alleged as emergencies, the consumers urged and the regulatory bodies sometimes even decided that the concept be made the sole basis for fixing rates. Something akin to mob phychology took hold of the consumers for a time in their attack upon utility rate structures.

While the crest of this movement has passed it will leave its impress for a long time, in fact, it may influence permanently the relative consideration to be given to value of service, ability to pay, and cost of service. Frequently where reductions were urged and sometimes ordered, upon the plea of value of service the basis in mind was really ability to pay, or its corollary, willingness to pay.

Even though this recent movement called renewed attention to all the factors to be considered in rate making besides the total cost of service, there still appears to be too much generalization and random use of terms. For example, the phrase is so often used "value of service to the consumer."

What consumer? Are all consumers to be treated alike in the application of the concept? Clearly the value of the service, in terms of rate making, is not the same to the individual consumer, the domestic or family consumer, the mercantile consumer, the manufacturing consumer, the private or semipublic consumer, or the governmental consumer. It is difficult to visualize how these can all be considered collectively in this respect. The time element also enters. The value of service may be treated as both actual and potential with different weights attached to each according to the circumstances. The value of service may be direct or indirect. The latter has been insufficiently stressed.

● A reading of commission and court decisions and a number of texts and articles dealing with public utility rates involving considerations of cost of service, value of service, ability to pay, and what the traffic will bear, indicates a lack of proper differentiation between these concepts. In two recent articles value of the service and ability to pay were considered practically synonymous. Are they? In some commission and court decisions cost of service and value of service were inferred to be equivalent.

Ordinarily the successful operation of a utility enterprise demands that on the basis of prudent cost the consumers must provide, through rates, a definite annual revenue fund. The contributions to this fund by the various classes of service and localities are determined then by specific cost, value of the service, ability and willingness to pay. Extraordinary circumstances in a utility or serving area may require that the whole cost rule take a secondary position and the other concepts be accorded paramount consideration. Hence value of service, for instance, may have two uses: first modifying the distribution of the cost of burden; and secondly, replacing the cost concept under extenuating conditions.

It is the purpose of this article to discuss the various concepts *per se*, and in relation to each other, with a view to clarification of meaning and directness of application. Time has not permitted as thorough a treatment of some phases as the writer has hoped. In many respects the discussion is suggestive rather than conclusive, and should be considered in the nature of a progress report.

In view of all that has been said erroneously of the term "value of the service" since the Covington decision in 1896, and all that should have been cor-

rectly said, it is the belief of the writer that the sometimes elementary and repetitious nature of the following discussion is justified.

● From the individual consumer standpoint value of service is primarily subjective. He considers utility services in the same light as other economic goods and services in that he places a value upon them by introspection. Before purchasing utility services or additional utility services, he speculates by making comparisons with all goods and services he might consume to determine the actual and probable satisfaction and benefits derived, or to be derived, the gains or losses to be attained, usually weighing them quite carefully. Then he makes a decision and a choice and places an objective value upon them by money purchase, trade, or other definite exchange.

Generally speaking, the transaction would not have taken place unless the individual consumer had gained; therefore, the value of the service, if it could be objectively expressed, is greater than the cost to him of whatever he gave to acquire it, and it is usually greater than the cost to the utility.

While the freedom of choice is greater in nonpublic utility goods and services, there is nevertheless considerable competition through substitution in public utility transactions, and where actual monopoly exists and unwilling purchases are made under forced demand, an adjustment is inevitable.

Whenever the value of service is the same or less than the cost to the individual or to the utility, there is dissatisfaction and often confiict. Therefore, the value of service and cost of service, objectively considered are seldom equal, but usually unequal with the margin in favor of the value of service as measured by the satisfactions and benefits received. This pertains of course exclusively to individual consumption where the customer makes personal use of the utility services such as water, heat, light, transportation, and communication.

● In any representative utility district, all of the individual subjective appraisals placed upon the services, collectively or compositely considered, may be termed as the value of service to the community of individual users. In this category, utility services are treated strictly as consumption goods and must be contrasted where they are used in the production of other goods and services as in retailing, wholesaling, manufacturing, etc., and must also be distinguished from their use by governments and paid for through taxes. The first pertains to intimate, or primary, personal consumption paid for by the consumer; the second, to auxiliary consumption as a means to further production and involves the enterpriser and the profit motive; and the third, to consumption to render governmental or institutional services with no profit motive, the former paid through taxes.

It is always difficult to develop definitions or classifications which are in so-called air-tight compartments, with no exceptions. While the use of water for drinking and bodily cleanliness purposes is a direct and intimate use, the water used for house cleaning and garden is an indirect use, technically speaking, since the consumer obtains the benefit through the consumption of other services, such as a tidy house or the pleasing sight of a lawn, flowers, shrubs, and trees.

On the other hand, water purchased by his municipality and used in an administrative building, in road construction and sewer flushing is indirect use to the citizen, but water used for street flushing or fire protection is more directly consumed by the individual but paid for by his municipality. In the latter case, such as street flushing, if the value of service to the individual consumer is less than the estimated cost, the consumer, as an abutting property owner to the street, can only make adjustments through the minds of those who have control of the municipal administrative offices.

● The same condition prevails in regard to street lighting which the individual consumes directly, but which is usually paid for through taxes or special assessment. When we take into consideration the various types of consumers; namely, individual, business, and governmental, then the general use of "value of service" is a vague term.

Not so with total cost of service. Here we have a homogeneous statistical unit; name, the monetary unit which can be applied to total costs and even to costs for different classes of service, or parts of service.

Total value of service, as such, is meaningless. As has been pointed out, we have value of direct personal use, value in use for further production, and value in use to carry on governmental functions. Money can reasonably measure the value in use of many utility services employed in further production, but the value in personal use and governmental use is intangible and defies the application of a too definite measuring stick. We must deal in approximations.

¶ *"A READING of commission and court decisions and a number of tests and articles dealing with public utility rates involving considerations of cost of service, value of service, ability to pay, and what the traffic will bear, indicates a lack of proper differentiation between these concepts."*

Thus, the question arises as to what the United States Supreme Court meant in a famous turnpike case when it said that besides cost the tolls charged the public should be fixed "... in view of the nature of the value of service rendered by the company."[1] This public highway was undoubtedly used for personal pleasure, for profit by individuals in business, and by governmental agencies in different proportions. What the court probably had in mind was the individual consumer use. The common notion that value of service applies to the individual or family consumer seems to prevail.

● In a recent article on this subject the following was said:

> From the public's point of view, the lower the rates, the more nearly do they correspond to the value set on the service by a large part of the population which must either stint its use, or do without it entirely. We come to the seeming paradox that by reducing the price of something we add to its value, since a service is worth nothing to the man who cannot pay for it. The system of promotional rates recognizes this principle in a similar way; after a certain minimum of a consumer's needs is satisfied, the service has less and less value for him, and because of this declining marginal utility he is willing to pay only a lower rate.[2]

The declining marginal utility of successive units consumed by the individual consumer may be different, as far as rate making is concerned, from the declining marginal utility of successive units used by the business consumer. A business, with a given capacity, as it uses additional units of utility service to increase its output thereby usually augments its profit and its return upon the investment. Thus its ability to pay is enhanced and the value of service of additional units of utility service is greater rather than

[1] Covington & L. Turnpike Road Co. v. Sandford (1896) 164 U. S. 578, 597, 41 L. ed. 560.

[2] "The Value of The Service," Eleanor Heyman, *The Journal of Land & Public Utility Economics*, August, 1933, pp. 252-265, 255.

less. When the plant reaches its capacity of production, it has no more use for utility services. The point of complete satisfaction is not so definite in individual consumption and stoppage of use is likely to be less abrupt than in business consumption.

● Subjective value in business consumption plays little or no part since the problem is to reduce overhead costs and idle time per unit of product and to return costs, with a profit if possible, as the output of goods and services is increased. To the extent that businesses, which use successive amounts of utility service, must sell the increased output at lower and lower prices, causing profits to decrease or disappear, the above analysis needs qualifications, but most businesses which survive a reasonable period are in the first category.

When the author holds that the lower the rates, the more nearly do they correspond to the value of service to the poorer classes of consumers, he should more correctly refer to the ability to pay or willingness to pay of these consumers. There usually is ample margin between the value of service in use and the price charged.

The author's statement that "service is worth nothing to the man who cannot pay for it" is to deny the existence of potential value.

In another article deploring the assumed neglect of the public utilities commission of Connecticut to give proper weight to value of service in two water cases, the critic (a witness for the consumers in the cases) places considerable emphasis upon the individual user. The decision of the commission in the Ansonia Water Case makes the following reference:

> This raises the question—what is the reasonable value of the water service without which a community could not exist? Clearly the value of the service is the cost to the company, honestly and economically managed, of maintaining properly its plant and equipment, its operating expenses and overhead charges, and a fair return on the fair value of the property necessarily used in the rendition of such public service.
>
> The cost of water to the average domestic consumer is about 5 or 6 cents a day for the entire household, or about equal to the price of one small luxury per day. It is not conceivable that a necessary increase per customer of one or even two cents a day, in order that the company may properly maintain its service, would create an unbearable burden upon the community.[3]

● The criticism by the author of this defense by the commission that value of the water service and the rates are reasonable when based upon cost to the company is as follows:

> The next question is whether the commission is on solid ground in its assertion that an increase of $3.65 to $7.30 a year in the water bill to the average consumer is a matter of indifference when employment has sunk to less than 50 per cent of normal and when wage rates have been decreased simultaneously. The unemployed working man may reach a different conclusion. It is always the last straw that breaks the camel's back.[4]

Both the commission and its critic refer to the individual consumer and probably have underemphasized or ignored the importance of the business and governmental consumer. It would have been illuminating if the relative quantity of water consumed and revenues produced by each of these three classes had been given. The composite value of service and ability to pay may have been quite different. The commission definitely confuses cost of service and value of service, but this error will be treated later under "Confusion of Concepts."

Many decisions of commissions and courts involving rate making do not refer to the value of service of business or governmental consumers nor to the proportion of the service and revenues assignable to these consumers as compared with the individual ultimate consumer. In some decisions reference is made to the individual consumer in such a manner as to give the impression that the conditions surrounding his consumption control the methods and policies of rate fixing. Of course, if this is done with the view of writing a political decision instead of a judicial one the emphasis is thus well placed.

● That important recent decisions of some of the foremost commissions are referring primarily to the condition of the individual consumers may be exemplified by the decision of the Wisconsin Public Service Commission in the Wisconsin Telephone Case. Under the caption of "Value of Service" this statement appears:

> The ratio between the charge made for a utility service and the income of the general public available for such payments is another measure of value of service. If the charge for telephone service at a particular level represents, let us say, 5 per cent of the *average family income*, then if a drop in the general price level results in a drop of 50 per cent in that average income, in terms of dollars, and telephone rates remain constant, the question might well be raised whether this increase in the ratio of telephone rates total income did not seriously affect the value of th service. It would seem clear to us that the value of the service is definitely related to the income in dollars generally available for all essential services and commodities . . . (Italics supplied).
>
> If existing conditions continue and the drop in the general level of prices persists it may be necessary to fix rates in which the value of the service becomes an important and decisive factor and that time may be near at hand. Then more exact measures of value of service can and will be fashioned. In the light of economic history it is inevitable that the value of service must again be applied by utilities in order to keep their rates within the area where it may fairly be said that they are no greater than the services rendered are reasonably worth.[5]

(Please turn to page 34)

[3] *Re* Ansonia Water Co. (Conn.) Docket No. 5973, July 10, 1934, pp. 20-22.

[4] "Value of Service and Utility Rates," Clyde Olin Fisher, *Journal of Land & Public Utility Economics*, February, 1935, pp. 76-83.

[5] P.U.R. 1932D, 173, 264, 265.

## Service to the Individual Consumer

*"In some decisions reference is made to the individual consumer in such a manner as to give the impression that the conditions surrounding his consumption control the methods and policies of rate fixing. Of course, if this is done with the view of writing a political decision instead of a judicial one the emphasis is thus well placed."*

¶"SPEAKING . . . *broadly in terms of measurement, even with all the attendant indefiniteness, we may say generally that value of utility service to the individual is far greater than ability to pay for it, or than the actual price paid, or what the traffic will bear."*

By C. K. BROWN

# Switchboard Maintenance

**The use of relays in the operation of P. B. X. equipment is discussed in this issue by Mr. Brown.**

## PART V

● An outstanding feature common to the operation of P. B. X. equipment, is the use of relays. A relay is primarily an electrical switch by means of which an electric current flowing in one circuit closes or opens a separate circuit, and consists of an electromagnet, armature and contacts. These parts are arranged in such a way that when the iron core becomes magnetised by an electric current flowing through the electromagnet winding, the armature is attracted and moves sufficiently to open or close the relay contacts.

The magnetic circuit of a P. B. X. switchboard relay can be traced as follows: When the electric circuit through the relay winding is closed, the electric current which flows sets up a magnetic flux (total number of lines of magnetic force) in the magnetic circuit.

If the electric current is in such a direction as to make the end of the core nearest the armature a north magnetic pole, then the magnetic lines of force go out of the core across the air gap (space between relay armature and core) into the armature, through the iron part of the relay structure to the other end of the core and back to the starting point as illustrated in Fig. 1.

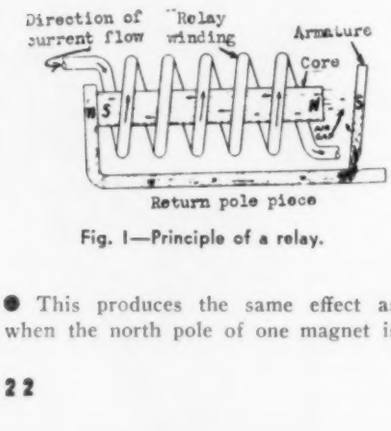


Fig. 1—Principle of a relay.

● This produces the same effect as when the north pole of one magnet is put near the south pole of another. Thus, the end of the relay core in this case is considered as being a south pole and the armature a north pole, and since unlike magnetic poles attract each other, the relay armature will be pulled up against the core if the magnetic force or pull is great enough.

If the electric current flow through the relay winding is reversed in direction, the effect will be the same, but the armature will be a south pole and the end of the core next to the armature a north pole.

When the armature pulls up, the air gap is shortened and the reluctance of the magnetic circuit is decreased, thereby causing the magnetic flux to be increased. Reluctance is defined as the resistance offered by a substance to the passage through it of magnetic lines of force.

Since the pull depends on the amount of magnetic flux, the relay armature will be held up with a greater force than that which was originally exerted upon it to pull it up. If the magnetic flux were allowed to become too great then the relay core might become saturated which would cause some relays to release slowly. This condition is prevented in several ways. Some relays have a part of the magnetic circuit of a small cross section which increases the reluctance so that even if the relay armature were allowed to come close against the core, the reluctance would be great enough to prevent too great a magnetic flux.

● Others have stop pins of copper or German silver which do not allow the armature to strike the core. Still others have non-freezing discs.

There may be from one to four windings on relays used in P. B. X. switchboard equipment circuits. For the purpose of differentiation these windings are classified at Primary, Secondary, Tertiary or Quarternary.

Where there are but two windings on the same relay core, care is taken to insure that the magnetism produced by one winding acts properly on the magnetism produced by the other. One winding can be made to add to or neutralize the magnetism of the other, depending upon the direction of the electric current flow and the direction in which the turns of insulated copper wire are wound upon the relay core.

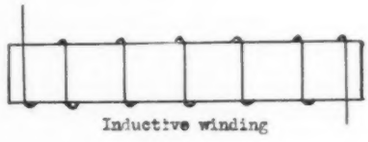


Fig. 2

At least one winding on every relay must be an inductive winding. An inductive winding is wound in such a manner that the electric current will always flow around the core in the same direction and thus cause the core to become magnetized.

● A non-inductive relay winding is wound upon the core in such a manner that the electric current will flow around the core in one direction through half of the winding and in the opposite direction through the other half of the winding, thus neutralizing the inductive effect.

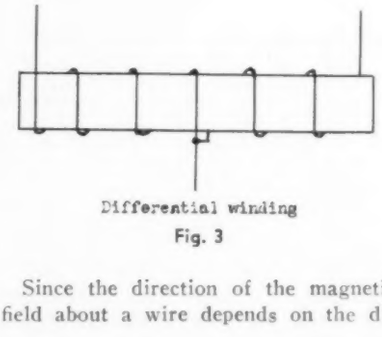


Fig. 3

Since the direction of the magnetic field about a wire depends on the di-

rection of the electric current, it can be seen that the field of the two electric currents flowing in opposite directions must oppose each other and will therefore neutralize each other if the wires are near enough together, therefore, such a coil is said to be wound non-inductively.

The term "diffential relay" is sometimes used and referred to as a relay having two inductive windings of the same number of turns, size resistance, and conductivity.

The ends of these windings are so connected that an electric current made to traverse them flows through the two windings in opposite directions, and therefore, when the current in each winding is equal to the inductive effect of one winding it is completely neutralized by that of the other.

If the electric current be of higher value in one winding than the other the balance will be destroyed, and if a compass needle is brought near the relay it will move in the direction of the greater current. Thus relays equipped with differential windings may be operated by energizing one winding and then released by energizing the other winding.

When it is recalled that conductors through which an electric current is flowing is surrounded by minute "magnetic rings" their number being in proportion to the value of the electric current flowing in the circuit, it may be readily understood why the magnetic strength of P. B. X. switchboard relays depends upon how much insulated copper wire is wound around the iron core.

● In consideration of this fact, it is quite evident that when the manufacturer of P. B. X. equipment winds the spools of relays with very fine insulated copper wire, more turns are placed, and consequently a greater number of magnetic rings are set up about the iron core when the current passes through the wire, than if the spool was wound with large, coarse insulated copper wire, because the latter would fill the spool with a much shorter length.

Although the smaller size wire has a higher electrical resistance than the larger size, the relay manufacturer must use it, because the desired result cannot be obtained from the large wire. The reason for this is that, with the coarser wire, the outer turns around the relay core would be far too removed from the iron to make effective their magnetic energy. The fact is that relay electromagnets are not wound much beyond the point where the thickness of the turns of wire, one above the other, is equal to the diameter of the iron core itself because to

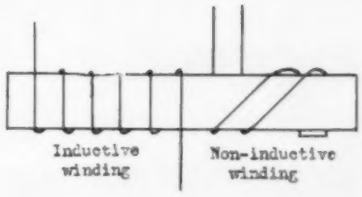


Fig. 4

do so, results in a waste of energy in proportion to the expenditure.

The relation of very fine insulated copper wire wound upon the spools of P. B. X. relays to the passage of an electric current of small value and vice versa, may be shown in another manner. If, for instance, one turn of insulated wire around the iron core of a relay will produce a certain magnetic strength, two turns will double the strength, while 10 or 100 turns will increase it that many fold. This is equivalent to stating that the electromagnet of a P. B. X. relay will be equally magnetized by an electric current of say, one-tenth ampere flowing once around the core, or a current of one one-hundredth of an ampere passing around it 100 times, that is, the same number of magnetic lines of force will enter the iron core in either case. It is because of this latter condition that it is possible to use electric currents of small value in long circuits of high resistance. Relays of high resistance are used in conjunction with these currents of small value for the same reason.

● It has been shown that where an electric current flows through a conductor, a magnetic field is set up around that conductor. This magnetic field lasts as long as the current flow lasts. Furthermore, when two currents of electricity flow near each other in parallel conductors, they will attract each other while flowing in the same direction, and repel each other when fheir course is in opposite directions. The nearer together these electric currents flow, and the greater the value, the greater will be their attractive or repulsive action upon each other.

Whenever this interaction occurs, there will be found in circulation a greater or lesser number of foreign lines of magnetic force, and if this foreign magnetic field happens to be near where it is desired to produce a magnetic field with similar magnetic lines of force, the two forces are certain to interfere with each other.

A P. B. X. relay will, therefore, develop this undesirable self-induction. With a stated value of current flowing in the relay winding, self-induction develops in a degree represented by the square of the number of turns of wire in the winding, multiplied by the value of the electric current in amperes.

As the hundreds of turns of insulated copper wire comprising the winding of relays are wound side by side, it is evident that the electric current flowing in each turn of wire not only travels in the same direction as it's adjacent turn, but it lies as closely to it as possible, only the thickness of the insulating material intervening.

● The result of the reaction between the turns of wire in relay winding causes a separate E. M. F. to be produced in the winding, the value of which is invariably opposed to the E. M. F. of the P. B. X. battery producing the current flowing through the relay. This separate E. M. F. is called counter electromotive force. It not only opposes the electric current in attaining it's full value in the winding, but tends to check it's exit, thus retarding the operation of both magnetising and demagnetising the iron core.

In certain P. B. X. circuit arrangements one of the means adopted for overcoming the effects of self-induction in a relay is by the addition of a non-inductive resistance in series with it. The object of inserting the non-inductive resistance in the relay circuit is to aid in weakening the counter electromotive force of the self induction in the winding by giving it extra work to perform outside of the winding instead of exerting its force entirely within the relay winding, and in consequence thereof, the greater the ratio of such added non-inductive resistance in the circuit is to the value of the P. B. X. battery E. M. F. the less undesirable influence will be produced by the counter electromotive of self induction.

In general P. B. X. relays may be divided into two main groups, that is, relay operating on direct current and relays operating on alternating current. Each of these groups may be subdivided according to the type, purpose or special characteristics of the relay such as slow acting, slow releasing, polarized, etc.

(TO BE CONTINUED)

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Thirty-five years ago, Bell System telephones could be connected with only 36 per cent of the telephones in the world. Today, about 93 per cent of the world's 35,000,000 telephones are within reach of any Bell or Bell-connecting telephone.

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About one out of every six stockholders of the American Telephone & Telegraph Company is an employee of the Bell System. Of these employee stockholders, about 30 per cent have owned stock for five years or more.

# An Announcement

RALPH C. RENO

RAY W. SMITH

Resignation of Ralph C. Reno as editor and vice president of TELEPHONE ENGINEER, which became effective November 15, to accept the position of Public Relations Counsel of Telephone Bond and Share Co., with headquarters in Kansas City, was reluctantly accepted by the board of directors of this publication.

Mr. Reno moves to Kansas City, leaving a host of friends in Chicago and its immediate vicinity. In his new position he will devote his time to maintaining and establishing cooperative understanding, good will and confidence with the public in the communities served by the operating telephone companies of Telephone Bond and Share Co.

Having been associated with TELEPHONE ENGINEER since 1932, and having a large acquaintance in the telephone industry, the management of this publication considers Mr. Reno ideally fitted for his new endeavors and wish him every success. Most of our older subscribers are quite familiar with the record he has made as editor of this publication and are indeed glad to know that he will continue his work in the telephone fraternity.

Prior to his association with TELEPHONE ENGINEER, Mr. Reno was in the newspaper field and later was connected with Stewart, Hanford and Frohman Advertising Agency of Rochester, N. Y. While with this organization he was closely associated with the telephone industry.

● Selection of Ray W. Smith, formerly editor and publisher of The Transmitter before its consolidation with TELEPHONE ENGINEER, as editor and vice-president of this publication to succeed Ralph C. Reno, resigned, will mean a continuation of the association of father and son that was interrupted a few years ago. Ray Smith is the son of J. A. Smith, our president, and many of our readers will remember him through association with his father in years past.

The management feels sure that this selection will be a popular one to its readers; and having the host of friends he gained when formerly connected with the telephone industry, we can assure our subscribers that Ray is indeed glad to again associate with this industry and again greet old friends.

Having been practically "brought up" in the publishing business, and having the years of experience of newspaper and journal reporting, TELEPHONE ENGINEER is indeed glad to greet Ray Smith as editor.

## Russia's Telephones

Telephone service, both national and international, is growing more popular in Russia. At present, the Soviet Union has telephone communication with seventeen foreign countries, and during 1935 international calls averaged 453 a day, a gain of fourteen per cent over the previous year. Most of the calls are to France, Germany, Great Britain, Poland, and Latvia.

## Spain Takes Over I. T. & T. Telephone Unit

The International Telephone and Telegraph Co. reports the Spanish government has issued a decree militarizing the Spanish Telephone Co., a subsidiary operating in Madrid.

"We are advised that this action was taken pursuant to the contract between the company and the government which gives the government the right to take over operations in cases of grave disturbances and provides that the government will indemnify the company for all damages as well as for losses sustained," a statement said.

I. T. & T. has a $50,000,000 investment in the Spanish Telephone company, which was organized in 1924. The system has been unified, improved, and extended, and connected with the telephone systems of other countries by land line or radio telephone.

Latest figures show 8,600 employes, the majority of whom are women, with 20 Americans on the permanent staff. Col. Sosthenes Behn, president of International Telephone, has been in Madrid since before the civil war, and has been in daily communiccation with the home offices in New York for business and personal matters. On July 1, Spanish Telephone served 346,000 customers.

## Oil Areas to Get Improved Service

The Southwestern Bell Telephone Co., through the facilities of the Western Electric Co., is under way with the installation of a $15,000 carrier system to increase long-distance circuits to Dallas, Texarkana and other Texas localities.

According to J. E. Hawley, foreman for the Western Electric Co., the installation is required here to provide additional talking circuits into the area adjoining Talco, center of oil development in this section. Mount Pleasant was chosen for the equipment due to the fact that it is the largest town in the vicinity.

## Bell System Telephone Gain Higher

The American Telephone and Telegraph Co. reports an increase of 109,200 telephone in service in the Bell system during October, 1936. The gain in October, 1935, was 62,600.

Ten months' gain was 719,500, or about double the 360,000 station gain shown a year ago. Indicated improvement for the year will top 850,000 stations against the gain last year of 465,000.

# RS ARE TELLING US

## Good These New
## NOPHONES Are!

e two new Monophones, we
the story of their different
features of operation, their
pressed were telephone com-
hat orders began pouring in

the orders are still pouring in!
laboratories of everyday use,
outstandingly superior these

nly because our faith in the
engineers has been justified
e contributed toward making
more convenient instrument
longer-lasting investment for

e new Monophone creations,
your company?

**ELECTRIC**
**D SIGNALING PRODUCTS**

ANY, 1033 W. Van Buren St., Chicago
ALES COMPANY, LTD., Chicago

The Type 34A3 self-contained desk Monophone. No bell box is required for this model, since all parts are contained within the compact, molded base.

# Independents Hold Record Breaking Convention

**Big attendance of operating men and exhibitors indicate that industry is well along on road to recovery. Bright future looms.**

● Taking as a standard of measurement the great convention they held at Chicago, October 13-15, one must judge the Independent telephone companies of this country not only to be well along the road to prosperity, but supercharged with an enthusiasm that augurs well for the future.

In point of attendance, the 40th annual convention of the United States Independent Telephone Association was a record breaker. Also at the convention there were 56 exhibiting manufacturers and suppliers, which is a record. Eleven more firms exhibited this year than at any previous gathering of the Independent telephone industry. These exhibits were complete and indicative of the industry's progress.

The program and arrangements for the Convention were admirably handled and the division conferences on plant, accounting, traffic and commercial subjects, which were resumed after an interval of several years, attracted large attendances, as did the general sessions of the program.

● Nine new directors were elected while five whose terms expired this year were re-elected. Included in the newly elected directors were three members of the General Telephone Corp. and F. R. McBerty, president of the North Electric Mfg. Co. Names of the new and re-elected directors appear on page 32.

## OFFICERS

**President, F. B. MacKinnon, Chicago.**

**Vice-President, John H. Agee, Lincoln, Neb.**

**Vice-President, B. L. Fisher, Martinsville, Va.**

**Vice-President, Louis Pitcher, Dixon, Ill.**

**Secretary-Treasurer, C. C. Deering, Des Moines, Ia.**

In opening the convention, President F. B. MacKinnon called upon Secretary C. C. Deering to give his report on the association's finances and membership.

The association, Mr. Deering said, operates on a budget fixed by the executive committee in December of each year. This year expenditures were kept within the budget, the treasury showing a small balance.

Discussing the association's membership, Mr. Deering said that there were 175 class A and B companies, 198 direct and contributing C companies, 1,371 certified C companies, those that come into the association automatically by virtue of their membership in the state associations. The membership includes, in addition, 49 manufacturing companies, four foreign companies, five associate members and 33 state associations (classified as honorary members). This makes a total of 1,831 members, a gain of 166 over last year. Part of this gain is among class A and B companies but the larger part consists of Class C companies which came into the association by virtue of their membership in their respective state association.

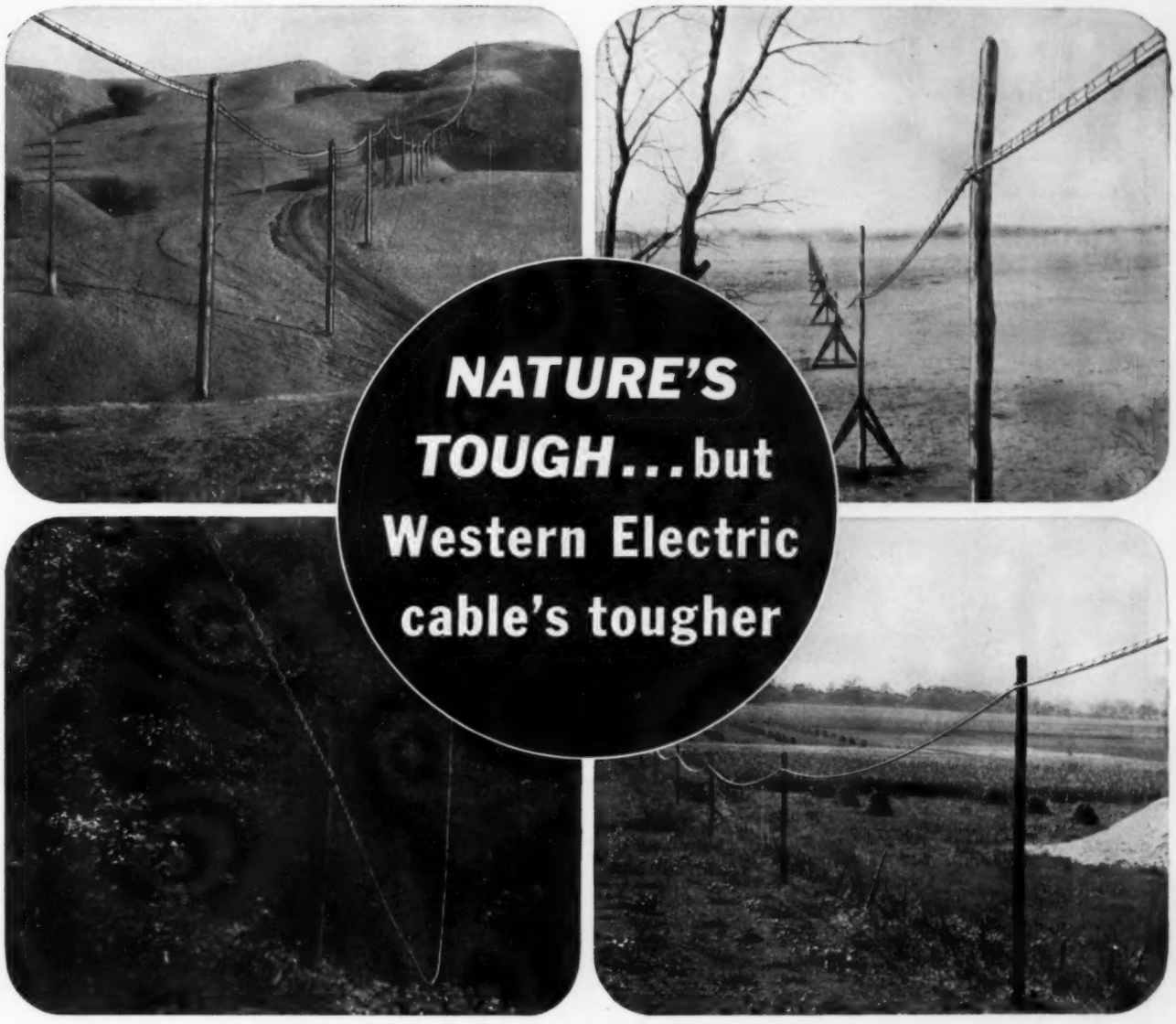
● Alfred L. Geiger, general attorney of the association, presented the legal problems of the year and in his annual report reviewed the work of the Washington office, with particular reference to its contacts with the Federal Communications Commission and the Bureau of Internal Revenue. He presented a summary of the cases decided by the FCC during the past year that are of interest or concern to Independent telephone companies. The association's counsel also discussed legal and accounting questions which may arise under the new legislation enacted at the last session of Congress.

President MacKinnon then gave his annual address, reviewing the Association's activities and problems. In his review, President MacKinnon stressed

(Please turn to page 32)

F. B. MAC KINNON, President

JOHN H. AGEE, Vice-President




Yes, mountains... plains... swamps... deserts... heat... cold... rain... drought... are tough. But Western Electric telephone cable can take it — year after year.

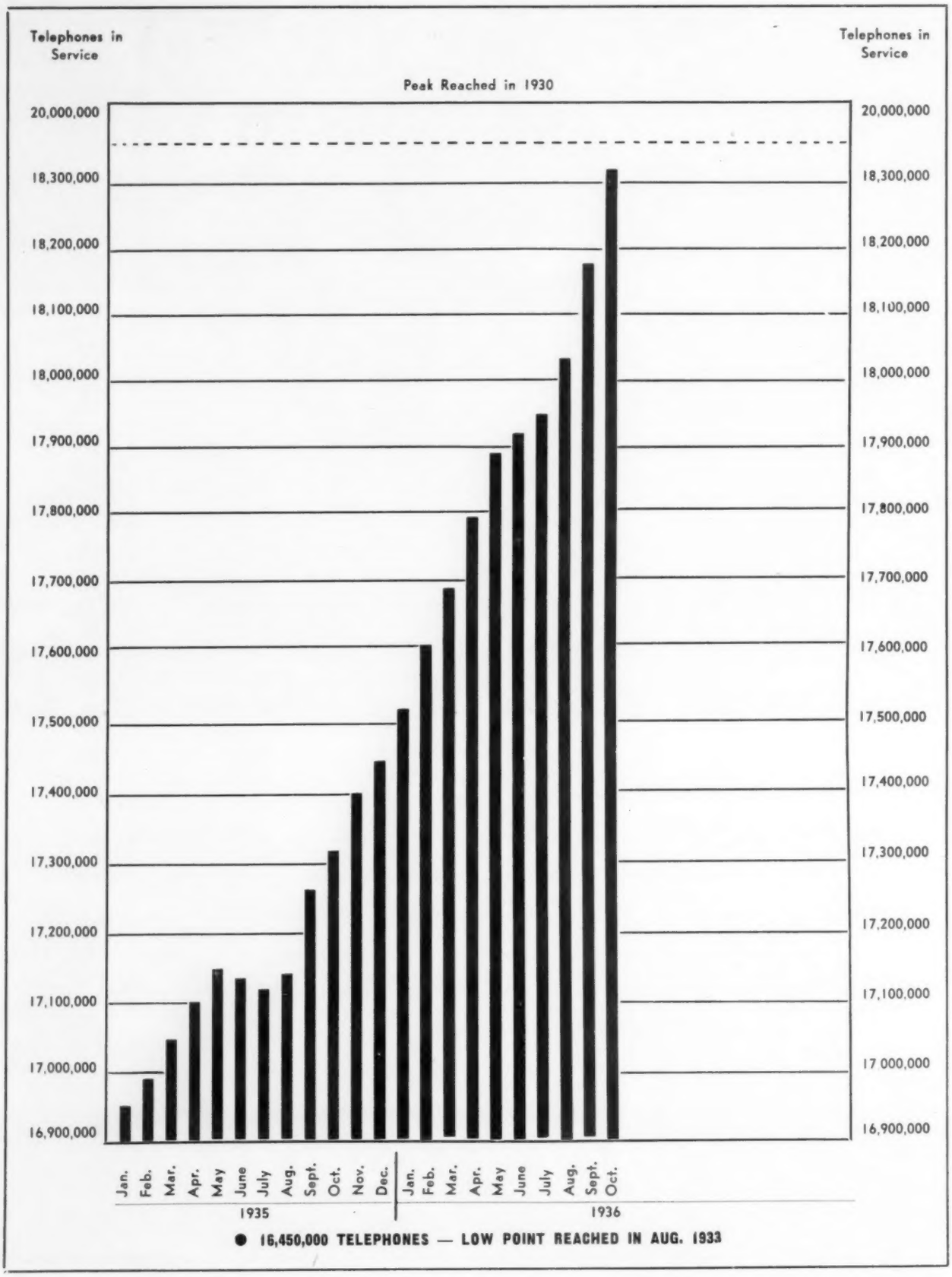
Among the many standard types are: lead covered—impregnated jute protected —tape armored—wire armored submarine—textile insulated and cellulose acetate lacquered terminating cables. Or your own specifications will be followed in producing special cable to meet your need. For full information, write Graybar Electric Company, Graybar Building, New York, N. Y.

**Western Electric**

Distributed by GRAYBAR Electric Company In Canada: Northern Electric Co., Ltd.

LEAD COVERED CABLE AND TELEPHONE APPARATUS

# Monthly Telephone Station Barometer



## "Tapping In" On Washington

(Continued from page 14)

penses being charged to operations and coming from pockets of rate payers.

• • •

### *"Original Cost" as Factor for Rate Base Major Theme of Briefs . . .*

● The briefs, submitted by the Bell System and General Telephone companies and by the Federal Government, FCC and National Association of State Commissioners in the accounting system case before the U. S. Supreme Court, pointed their principal arguments upon "original cost" accounting of telephone plant and what were the objectives for the recording of "original cost."

In the argument before the Supreme Court the counsel for the two sides—the telephone industry and the governmental regulatory bodies—followed their briefs reasoning in great detail. A major theme was how the showing of "original cost" on the books of the telephone companies would affect the rate base determinations by the regulatory commissions.

The briefs of the American Telephone and Telegraph Co. and Bell System companies and of the seven carriers in the General Telephone group emphasized that the aim of the "original cost" provision in the FCC Accounting System was to establish a "fallacious rate base". This would prevent the establishment of actual investment of telephone companies in plants, it was contended, and did away with rule of "prudent investment."

● "A fundamental objection to this system," the A. T. & T. brief stated in a succinct exposition of the opposition to the FCC system, "is that it has an eye only for a new theory as to a rate base and requires the companies to keep their accounts on that basis. It requires a company to keep its books on a basis which ignores its own actual transactions and falsifies its financial condition. It ignores the fact that the accounts are not only for use in rate making but for the information of the management, the shareholders, the investing public and the income tax collector. Accounts kept as this order prescribes would mislead all of those interested in what the operations of the companies actually are."

Through the briefs of the Federal Government, FCC and National Association ran the dominant note that original cost and the acquisition adjustment provision over investment in excess of original cost were not illegal, arbitrary or unsound accounting rules. Original cost was viewed as an accepted element of determining a rate base and it was em-

(Please turn to page 42)


# LEICH SWITCHBOARDS

**Leich C. B. Multiple Switchboard. Welded Unit Steel Frame Construction, Bakelite Covered Tables and Panels.**

- LEICH central battery switchboards are modern in appearance and equipment.
- New materials and careful engineering are responsible for the high efficiency characteristic of LEICH switchboard apparatus.
- LONG life of all parts subject to wear is assured by the correct choice of materials.
- LEICH switchboards are favorably known for the accessible mounting of all equipment.
- Investigate LEICH switchboards before buying.

**If you have not used LEICH EQUIPMENT in your exchange you are missing the opportunity of getting the lowest maintenance cost. Ask the man who uses LEICH APPARATUS for his experience.**

**LEICH ELECTRIC COMPANY**
**GENOA, ILL.**

TELEPHONE APPARATUS BACKED BY 30 YEARS' SERVICE

(Continued from page 28)

some of the comments made by Mr. Geiger relative to keeping accounts of the number of employes and other data which will be required under the Social Security Act. He referred to the classifications of companies by the FCC and stated that all had been classified with the exception of about 50 companies.

Following comments directing particular attention to various portions of the program of the convention, Mr. MacKinnon analyzed statistics concerning 193 Class A and B companies covering the years 1931, 1933, 1934 and 1935. He referred to the station losses and gains in those years and the earnings.

● A highly interesting portion of the convention program occurred October 14 in a discussion by Dr. David Friday, Washington, D. C. economist, of "Is This Prosperity Real? Can It Last Without Planning?", during which he was interviewed by Professor S. H. Nerlove of the University of Chicago. Dr. Friday is a strong advocate of free initiative and competition in industry, while Dr. Nerlove is in favor of government intervention and regulation of industry.

Dr. Friday stated that definitely there is a real business revival, but he is not of the opinion that government action in Washington is responsible for the improvement. In fact, he believes that the various devices established in Washington by the Federal government had retarded recovery.

He said he did not think the large sums of money expended by the government had helped much in restoring our present degree of prosperity, and added he did not think the business situation would be greatly affected no matter the outcome of the election. His reason for this statement was that he believes the incoming Congress will reestablish its constitutional authority and be more independent of whoever is in the White House.

Dr. Nerlove spoke in favor of a measured degree of government regulation of business and industry. He believes that present conditions are encouragingly better this year but thinks that Uncle Sam must keep a firm hand on national business affairs. He thought that the money spent by the federal government in public construction has been very helpful in reducing unemployment and bringing back activity to those industries which serve the building and construction fields.

At the opening of the session on Thursday afternoon, October 15, a recommendation by the board of directors that the number of directors be increased from 31 to 34 and that the executive committee be increased from six to eight members, was approved by the convention.

● Another highlight of the convention was a description of radio television given by Professor C. F. Harding, head of the electrical engineering school of Purdue University and Professor R. H. George, his chief assistant. Dr. Harding discussed the economic status of television and especially the difficulty in bringing visual broadcasting to the rural population. He depicted the methods of cathode ray for reception and of the iconoscope for pickup and transmission and contrasted the difficulties of development of television as contrasted to sound broadcasting.

The final general session of the convention the morning of Friday, October 16, was given over to the report of the committee on Bell Special Services by Louis Pitcher of Dixon, Ill., chairman of the committee, and to a discussion

(Please turn to page 40)

## EXECUTIVE COMMITTEE

J. H. Agee, Lincoln, Neb.
E. C. Blomeyer, Chicago.
W. C. Henry, Bellevue, Ohio.
F. R. McBerty, Galion, Ohio.
J. F. O'Connell, Madison, Wis.
Louis Pitcher, Dixon, Ill.
Geo. A. Yanochowski, Chicago.
Geo. A. Scoville, Rochester, N. Y.

## NEW DIRECTORS

Arthur O. Black, general manager, Peoples Telephone Corp., Butler, Pa.

Oscar Burton, general manager, Gulf States Telephone Co., Tyler, Texas.

James N. Cox, president, Southern Continental Telephone Co., Cookeville, Tenn.

Harry M. Engh, vice-president and general manager, Pennsylvania Telephone Corp., Erie, Pa.

W. J. Gallon, president, Langlade Telephone Co., Antigo, Wis.

W. C. Henry, general manager, Northern Ohio Telephone Co., Bellevue, Ohio.

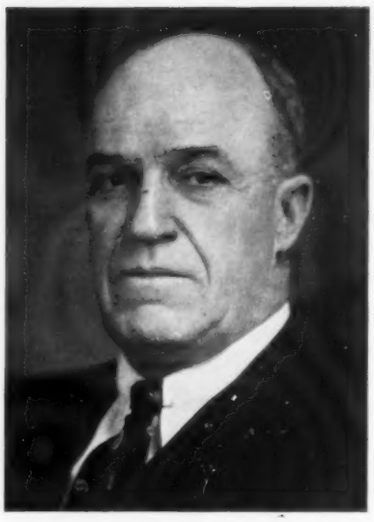
Chas. F. Mason, president, Associated Telephone Co., Ltd., Long Beach, Calif.

F. R. McBerty, president, North Electric Mfg. Co., Galion, Ohio.

J. F. O'Connell, president, Commonwealth Telephone Co., Madison, Wis.

## RE-ELECTED DIRECTORS

Frank S. Barnes, Rock Hill, S. C.
J. P. Boylan, Rochester, N. Y.
J. G. Crane, Kansas City, Mo.
P. M. Ferguson, Mankato, Minn.
H. L. Harris, Chicago.



C. C. DEERING, Secretary-Treasurer

LOUIS PITCHER, Vice-President

B. L. FISHER, Vice-President

## Another Paper Voices Opinion on FCC Probe

**Editorial from the Rockford (Ill.) Star**

"It seems that 600,000 stockholders are an important lot of people, with an influence even in a government notably antagonistic to business. And when these 600,000 stockholders declare that they are out of sympathy with the government's tactics in conducting an inquisition into their business they get results.

"That is the only interpretation that can be put upon the contemplated change in policy on the part of the federal communications commission in handling the investigation of the American Telephone and Telegraph company. . . . .

"The complaint, voiced particularly against Becker (FCC Special Counsel), was that the A. T. & T. probe came close to 'persecution.' Personalities were injected into the interrogation and yes and no answers without qualification of any sort were demanded of utility managers. The 'persecution' reached a high point when President W. S. Gifford was put on the grill. These methods stemmed from the tactics of Ferdinand Pecora, who handled the banker probe. . . . Protests stirred such resentment that congressmen were soon calling the communications commission and even people higher up than that to ask that the A. T. & T. quiz be put back on the rails. Meanwhile, the probers had gone through their first $750,000 grant and were asking congress for $400,000 more to continue probing. There was some opposition to their being given the money. Even the commission is reported to be dissatisfied at the meager results gained thus far from the $1,150,000 outlay.

"How much salvage in actual investigation can be taken from the affair is not very clear. The telephone utility wants to get into the record something on the engineering aspects of the utility. That angle certainly ought to be considered. . . .

"The hearings will be resumed in October. If Mr. Wheat (newly appointed FCC Associate Counsel) has charge, there will be less play for the press, considerably less of personalities, and a far clearer picture of both the good and the bad in the utility. Which is what the public paid for when it put up the $1,150,000."


POWER

*when you want it!*

***Here is a battery built to give you the power needed, at the voltage required—whenever you want it!***

**The fundamental requirement of any telephone battery is that it delivers with absolute dependability the power needed—whenever needed—under either normal or emergency operating conditions.**

**Exide-Chloride Telephone Batteries more than meet this requirement since the unique construction of their famous Manchester Positive and Box Negative plates assures a much longer life of dependable service.**

**More than forty years of satisfactory service in every kind of telephone work, under every conceivable condition, in every part of the country has adequately testified to the claims of absolute dependability, long life and economy that are made for Exide-Chloride Telephone Batteries.**

Exide

BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia

*The World's Largest Manufacturers of Storage Batteries for Every Purpose*

Exide Batteries of Canada, Limited, Toronto

## Value-of-the-service in Rate Making

(Continued from page 20)

● There is some confusion here between ability to pay and value of service. In regard to the emphasis placed by the Wisconsin commission upon the value of service to the individual consumer, it is evident from a review of the decision that while business consumers are mentioned, there is no attempt to weigh the relative number of stations or revenues of the three classes of consumers; namely, individual, business, and governmental, and measure their respective values of telephonic communication services and their respective abilities to pay. Undoubtedly these conditions are different. The depression has not affected them all alike. They are usually charged different classes of rates. In Madison, Wisconsin, the home of the public service commission, and the seat of the state government and state university with large P.B.X. systems, together with federal governmental units, a city and county government, many mercantile units, and some manufacturing establishments, it would have been interesting and valuable to know from a telephone rate-making standpoint what relative importance the residence consumer possessed.

An analysis of sources of revenues, or consumption of utility services, shows that a considerable part of the revenues and consumption may be derived from production use. Where a large proportion of utility service is used for further production it should not be placed in the same category as individual use.

● For instance, a large integrated electric utility operating in a part of California has the following percentage of distribution of about two billion kilowatt hours sold during the year 1934:

| *Class of Consumer* | *Pecentage* |
|---|---|
| Residence | 13.6 |
| Business | 5.2 |
| Industrial | 25.1 |
| Agricultural | 23.6 |
| Oil production | 13.0 |
| Railway | 12.7 |
| Government | 6.6 |
| Company use | 0.2 |
| Free | — |
| Total | 100.0 |

Only 13.6 per cent of the current sold to residential consumers may be classed as ultimate individual consumption paid for directly by the consumer. Approximately 80 per cent of the current is used in the production of other goods and services involving the profit motive, while less than 7 per cent is required for governmental purposes and paid for through taxes. Upon a revenue basis the proportions are as follows: individual or domestic 33 per cent; business 60 per cent, and government 7 per cent.

The value of the service and ability to pay in the case of the consumers of this utility depend primarily upon the ingenuity and efficiency of the enterpriser. Since agitators so often espouse the supposed cause of the individual consumer it probably would be an effective argument in many instances to show how much of the utility services are used by enterprisers to produce other goods and services with the expectancy of making profits. However, to return to the question in hand, to speak of the value of service to the individual consumer of the above electric utility is to refer to a very small part of the current sold and is likely to overemphasize that aspect of the utility service.

● To obtain the proper orientation of the meaning of value of service, it is probably necessary to make some elementary and homely analyses. For example, in the case of value of water service to the individual, the value of drinking water is the value of life itself. Impure and unpalatable water decreases human efficiency and impairs happiness and contentment. Value of water in this light is, objectively, immeasurable. Here is a clear case where value of the service and ability to pay are not the same. One is subjective and the other objective. Measurement, objectively, can only approach or betoken the value of service, but it can never definitely gauge it.

Now some of the same life-preserving attributes which may be assigned to drinking water consumption may be assigned to water used for washing bacteria from the hands before handling food, and for general bodily cleanliness and for cooking. Electricity in a hospital operating room is essential to save life, as is the use of electricity in diagnosis and therapy. In case of earthquakes, floods, storms, the electric or gas light required in a telephone company operating room may have the same importance. Gas used for heating hospitals and homes, or residence telephone communciation in case of serious illness or accidents, may be the means of saving lives.

● Even daily local transportation to and from work takes on a value of service far above the ordinary value of utility consumption. Such transportation is of a highly necessitous nature. That to be with it. or without it, may mean the difference between a self-supporting citizen and a public charge.

Hence, services having such a high subjective value to the individual are, as stated, objectively immeasurable in money, or other media. We need not worry particularly about the indefiniteness of the term value of service, as described, which might in the minds of some render it useless. Very few things in the realm of the social sciences are definite. Even when utility services are measured objectively in money, we find that the value of the dollar does not remain fixed. During the periods of inflation and deflation through which we have just passed, the value of the dollar, year by year, varied considerably. Speaking, therefore, broadly in terms of measurement, even with all the attendant indefiniteness, we may say generally that value of utility service to the individual is far greater than ability to pay for it, or than the actual price paid, or what the traffic will bear.

● While in many instances we may not accurately measure the value of the service objectively, we nevertheless can place a worth upon the various utility services by comparisons. The values of service for different classes of consumption rank from high to low. For instance, returning to water consumption. The value in use of water for drinking is the highest. The use for cooking and bodily cleanliness may be placed next, and the value then decreases as we use it for washing clothes, cleaning house, watering lawns, gardens, trees, washing driveways, sidewalks, etc.

● In a recent case a commission stated that $2 per month per tree for water was considered exorbitant when comparing it with a boarding house water bill, which is only about twice as much. In other words, if $4 per month for highly essential use is considered fair, then $2 per month for a much less essential use is exorbitant. Thus we have here a fairly definite measure between various uses of water. The same sort of

(Please turn to page 42)

### Value of Service Many-sided

*". . . value of service has numerous gradations and is many-sided; . . . it is primarily subjective to the individual consumer, and both subjective and objective to the business and governmental user; . . . it may be direct and indirect in its effect; . . . it is potential and actual. Therefore, value of service is a generic term composed of many kinds of definite specific values of service."*

## Joseph Harris, Prominent Pioneer, Passes Away

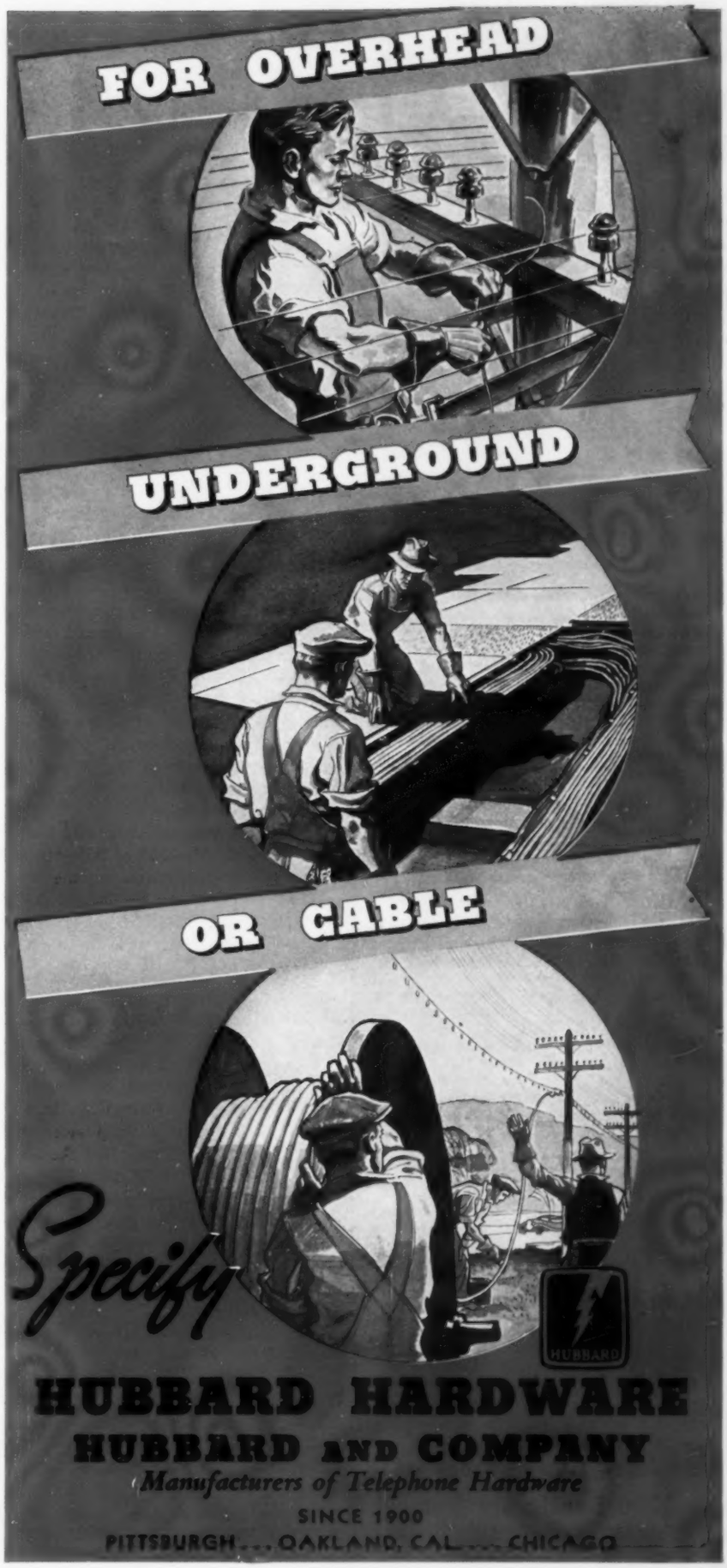
On October 30, Joseph Harris, pioneer telephone man and Independent manufacturer, ended a most brilliant career at the age of 82. He passed away at the home of his niece, Mrs. Samuel Hammer of Philadelphia, Pa. Final rites were held in Chicago with interment at Rosehill cemetery.

A resume of Joseph Harris' career reveals a history fraught with most interesting data and accomplishment. Being instrumental in the development of automatic telephony, he was one of the real pioneers of an industry that has shown greater strides during the past decade than most other could claim. His service to telephony in his foresight in bringing the attention of the world to the original invention of A. B. Strowger, inventor, has turned into a real service to not only his associates but to the world in general.

This association, starting in 1891, marked the same year for the formation of Strowger Automatic Telephone Exchange, to be succeeded later by the present Automatic Electric Co. One of his sons, the late Harmon A. Harris, was also connected with the latter company in a capacity of vice-president from 1905 till 1924, serving also as general manager during the last five years of that period. Joseph Harris was survived by his widow, Mrs. Grace Cole Harris, whom he married in 1877, and a son, Sanford F. Harris.

As president of Automatic Electric Co., Mr. Harris was in charge when financial interest in the company was obtained by three prominent Independent telephone men—Theodore Gary, A. F. Adams and H. L. Gary, all of Kansas City, Mo. Retiring from the more strenuous activities as president to chairman of the board, Mr. Harris was able to see the rapid expansion and development that today means that the original product he was instrumental in presenting the world is now known in all parts of the globe.

Not only was Mr. Harris a telephone man, as is evidenced by his other accomplishments in the line of civic improvements. Associated with Albert G. Wheeler, he was the determining factor of the freight tunnel system under the downtown district of Chicago, and was also selected as a member of the board of directors of the Chicago Tunnel Co., which operated the system.



**COOK NO. 100 CENTRAL OFFICE PROTECTOR**

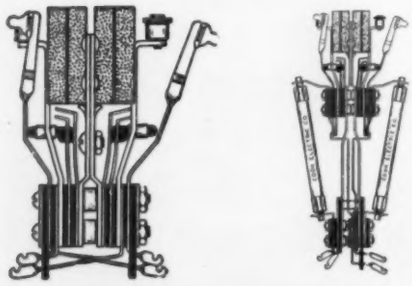
**contains ratchet type self-soldering heat coils. No heat coil to solder, remove, turn or replace. The positive permanent contact between heat coil and switchboard spring, the ease and economy of the relatching coil, and the adequate testing facilities has made this protector a favorite among thousands of telephone engineers in this country and abroad.**

**No. 100 contains self-soldering heat coils, lightning arresters and an alarm circuit. When operated, this protector opens the circuit, grounds the outside line and closes an alarm circuit.**

**No. 105 contains self-soldering heat coils, lightning arresters and fuses. Like the No. 100, when operated, the protector opens the circuit, grounds the outside line and closes an alarm circuit.**

**Regardless of the location of your exchange, or its size, there is a Cook Main Frame and Protector designed to adequately protect your central office investment.**

***To be safe, specify COOK.***



**COOK ELECTRIC CO.**

**2700 Southport Ave.**
**Chicago, Ill.**

# Pioneers Have Best Year In History

● Finishing the year in the best financial condition in its history, the Independent Pioneer Telephone Association looked forward to an active and prosperous future at its annual meeting held October 15, during the annual convention of the United States Independent Telephone Association in Chicago.

The Pioneers elected L. M. Berry, president of L. M. Berry & Co., directory advertising counselors, as president of the association for the ensuing year. Mr. Berry has been associated with the telephone industry for 28 years and under his leadership the Pioneers should have an unusually successful year.

● Frank E. Bohn, Ft. Wayne, Ind., and C. W. Forbes, Manteca, Calif., were elected vice-presidents; J. K. Johnson was re-elected secretary-treasurer and Miss Julia Harmon was named assistant secretary-treasurer.

In the absence of President Charles A. Rolfe, Beverly Hills, Calif., Past President H. E. Bradley, Harrisburg, Pa., presided at the meeting. Mr. Bradley read a letter from Mr. Rolfe, expressing regret at being unable to attend the meeting.

J. R. Van Pelt, assistant director of the Rosenwald Museum of Industry and Science of Chicago, stated that the Independent Pioneers were the biggest donor in the history of the Museum and that they gave the first gift as a donor.

● Several resolutions were presented and adopted. The report of the resolutions committee was presented by E. D. Glandon of Pittsfield, Ill. The first resolution recognized the value of service performed by the committee on entertainment consisting of George W. Rodormer, chairman; John F. Japp, secretary; Frank L. Eldridge, Roy W. Siemund, M. A. Bellion and H. T. McCaig.

Regret for President Rolfe's absence and best wishes for his good health and comfort for the years to come were expressed in another resolution.

Resolutions of respect, and sympathy and condolences to the families of deceased members were offered. These were: C. L. Brown, John W. Coffey, Richard H. Coyne, James E. Finley, Lewis Gifford, J. A. Harrill, C. J. McMahon, D. C. McKee, Sidney Arthur Mounteer, J. M. Plaister, J. L. O'Banion, Harry E. Starner, Claude R. Stoops, and J. M. Woodcock.

Another resolution was on the death of Jay G. Ihmsen of Albany, N. Y., on September 26, 1936. Mr. Ihmsen was a past president of the association.

L. M. Berry

Eleven hundred Pioneers and guests attended the annual banquet, entertainment and dance, sponsored by the association. The program, featuring nationally and internationally known entertainers, was unique and was applauded by those attending as one of the best the Pioneers has ever sponsored.

## Illinois Bell Gets Tax Cut

The Illinois Bell Telephone Co. is exempt from paying the 3 per cent state utility sales tax on industrial business, according to a ruling by the Illinois Supreme Court.

The company must continue to pay the tax on residential and commercial calls. The ruling was on an appeal from a decision of the Sangamon County Circuit Court, which dismissed the company's suit for an injunction restraining the state from collecting $2,000,000 in taxes paid in escrow pending a final decision.

The court held that telephone service is subject to the same exemptions as have been accorded industrial power and water utilities.

## Plans Underground Cable

The Commonwealth Telephone Co., is making an extensive survey of New Holstein, Wis., for the purpose of laying its wires underground wherever possible, and particularly along the main street.

## N. Y. Association Selects A. R. MacKinnon

● At a directors' meeting of the New York State Telephone Association, held in Rochester, N. Y., November 13, 1936, Mr. A. R. MacKinnon of Chicago was elected Secretary of the Association to succeed the late J G. Ihmsen of Albany.

Mr MacKinnon is now on the staff of the United States Independent Telephone Association and served as Secretary of the Kansas Telephone Association for a period of three years. He will reside in Albany N. Y., where the head office of the New York State Telephone Association is located at 25 Eagle Street, and will assume his duties December 1, 1936.

## Pacific Telephone Co. Again Reduces Rates

A lower schedule of Pacific Coast interstate and California intrastate toll rates has been filed by the Pacific Telephone & Telegraph Co. with the Federal Communication Commission and the California Railroad Commission.

The new rates, effective December 1, will amount to an annual reduction of $550,000, it is estimated. The new rates are the same as those now currently in effect on long lines of the American Telephone & Telegraph Co.

Including the current reductions, the company has reduced rates an estimated $4,000,000 annually in about six months.

## Protests Interference from Power Line

The Watson (Ill.) Telephone Co. has protested to the Illinois Commerce Commission that the Central Illinois Public Service Co.'s high line, which runs parallel with the telephone line, is the source of noise and interference on its lines, making it impossible to give satisfactory service to telephone subscribers.

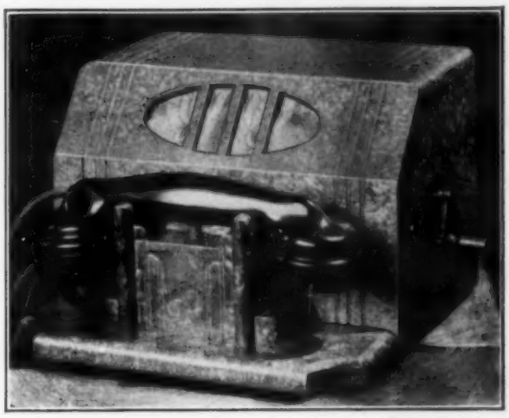
The commerce commission has assigned an engineer to inspect the lines.

## New Building

The Southwestern Telephone Co., has begun construction of an office and plant building in Alice, Texas, which, George Tait, district manager, says will cost $67,000. It is expected to be completed before Feb. 1, next.

There are only four countries having more than 100,000 telephones that cannot be reached by commercial telephone service from the United States. These are New Zealand, Japan, China and Russia.


# Play Fair With Your Magneto Subscribers



## Give Them the New TABLEPHONE

**Common battery subscribers have been demanding — and getting — new types of handset telephones that have beauty appeal as well as fine transmission qualities.**

**But until the Tablephone arrived, nothing had been done for the magneto subscriber. Now Suttle offers you this remarkably beautiful instrument at a price that you can't object to.**

**Surely your first-class magneto subscribers that pay you top rates are deserving of this fine modern style telephone. Already many hundreds of them are in service and the patrons are "tickled to death' about it.**

**Every one of you telephone men are thinking right now of some subscriber who would like this telephone.**

**Are you playing fair with that loyal subscriber by not giving him or her a Tablephone?**

The transmission qualities of the Tablephone are of the highest for a magneto instrument. The handset is the latest improved Leich product, offering clear reproduction without distortion.

The Tablephone is offered in six colors of a beautiful crystalline finish—Maroon, Green, Sea Blue, Brown, Gun Metal Blue, and Black. Color chart sent on request.

It is mounted on rubber cushions so it can be set on finest polished furniture without danger of scratching finish.

Order Them Out of Suttle Salesman Catalog

**SUTTLE EQUIPMENT CO.**

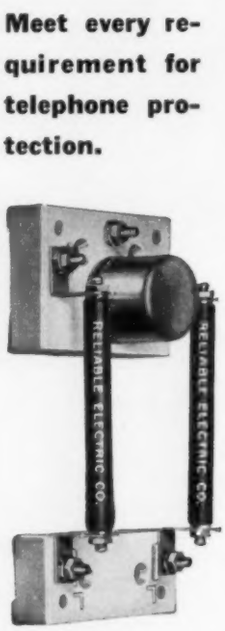
LAWRENCEVILLE, ILLINOIS

Reliable

**SUBSTATION PROTECTORS**

★ ★ ★

**Meet every requirement for telephone protection.**




**NO. 977HH**

**An indoor protector that is accurate and self-cleaning in operation, easy to install, and built to last.**

**WRITE FOR A SAMPLE**

**Reliable Electric Company**
**CHICAGO**

# LINE and DESK

RAY BLAIN, Member A. I. E. E., Editor

**Q. What scale should be used to indicate a toll line on a drawing?**

A. If the line is over one mile in length a scale of one inch to 400 feet is generally used and found satisfactory.

**Q. Do you consider galvanized wood screws superior to the blued variety?**

A. That will depend upon where they are to be used. The galvanized screw should always be used in all damp locations and where exposed to weather. Blued screws are satisfactory for use inside in dry locations.

**Q. How may one determine when switchboard plugs have worn to such an extent that replacement is necessary?**

A. Excessive plug wear generally causes cut-out trouble and in such case replacement is of course necessary. To determine accurately when plugs have reached the end of their usefulness a wear gauge should be obtained from the manufacturer of your particular switchboard.

**Q. Is heat coil alarm equipment on central office main frames considered necessary?**

A. Some companies use this equipment and consider it necessary while others do not and claim it is unnecessary. Due to the infrequent failure of the heat coil in modern central office protectors we would not consider this equipment necessary except in special cases.

**Q. What material should be used to seal cable in conduit to prevent leakage of water or gas into buildings?**

A. We would suggest a plastic compound made expressly for this purpose that may be purchased at a reasonable cost. It is a plastic compound that can be easily worked into the end of the conduit and around cables. It adheres with watertight contact to clay, fibre, iron, wood or cement conduit and all cable surfaces. It will not fall or sag but will harden slightly though not dry out over years of service. It is waterproof and acid resisting and can be easily removed when necessary with a thin sliver of wood or fibre without injury to the cables. It is repellent to rats, but contains nothing which will in any way injure the cable sheath, conduits or hands of workmen.

**Q. We are of the opinion that the modern line construction truck has one serious fault in that it does not provide adequate space for hauling the crew to and from work. Please advise whether any attempt has ever been made to correct this fault?**

A. The very latest development in utility motor truck equipment is a seven-man cab. It is understood that this new truck was developed to meet the growing demands of operators for a complete utility unit so equipped that the entire crew of men would be sheltered when going to and from work. One such cab is designed to carry a man on each side of the driver and five in the rear seat. The huge cab has four doors conveniently arranged so that workmen may enter and leave without disturbing the driver. The cab may be adequately heated.

**Q. What is the so-called "hog guy" used in telephone construction?**

A. Conditions in some locations make it impossible to install a guy away from the pole. In cases of this nature a hole can be dug at the base of the pole and the guy pulled down over the stand-off braces to form a truss arrangement. This type of guying holds satisfactorily on an ordinary pull.

**Q. What type of glove is considered most economical for linemen's use?**

A. The gauntlet glove is generally preferred by linemen as it protects the wrists when climbing poles. The glove should have good wearing qualities, be comfortable and not too heavy. A tight fitting glove is never comfortable nor can it give the service it would otherwise with the correct fit. Linemen's gloves are generally made from American horse hide, Belgian horse hide or deerhide.

**Q. What precautions, if any, should be taken when soldering a hole in a blow torch?**

A. The tank to be repaired should first be filled with water to remove all gasoline fumes. It is best to leave the tank partially full of water during the soldering operation. The tank should be tilted so that the water is not in direct contact with the surface being soldered.

## Houck McHenry, Industry Leader, Dies

Houck McMenry, president, Capital City Telephone Co. of Jefferson City, Mo., and one of the city's most prominent business and civic leaders, died at his home Tuesday, October 27, after an extended illness of complications. He was 68 years old.

Mr. McHenry had been in ill health for thirteen years and at one time visited the Mayo Brothers hospital in Rochester to receive treatment. Although he had shown instances of being on the road to recovery, he was never able to overcome fully his illness.

He remained at the head of the telephone company, which he assisted in organizing 36 years ago, and took an active part in its operation until about a year ago when because of his illness, visits to his office became infrequent. During the last several months, his condition was aggravated by a kidney ailment.

Mr. McHenry's death ended a long and active career in Capital City business and civic circles. For fifteen years he was a member of the school board. Active in Democratic politics, he served two terms on the city council. He was president for two terms of the old Commercial Club, now the Chamber of Commerce.

Houck McHenry was born June 21, 1868, at Westport, now Kansas City, the son of Mr. and Mrs. James Edgar McHenry, members of pioneer families who settled at the famous landing of the Missouri river near that is now Kansas City.

When Houck McHenry was eight years old, the family moved to Jefferson City where he lived the remainder of his life. He was educated in the local schools and was a graduate of the Jefferson City high school.

As a young man, he obtained employment as a baggageman at the Missouri Pacific depot, and for many years was engaged in the transfer business in that city.

Mr. McHenry, in 1900, assisted in organizing the Capital City Telephone Co. and was elected one of the first members to the firm's board of directors. Later, he increased his holdings in stock and at the time of his death was chief stockholder as well as president.

His reputation as a telephone executive spread. He had been president of the Missouri State Telephone Association and a director and vice-president of the United States Independent Telephone Association many years. He was a member of the Independent Pioneer Telephone Association.

Mr. McHenry was married in 1890 to Miss Thenia Bolton of Cole County, Mo., who survives. Also surviving is a son, Foster McHenry, assistant manager of the Capital City Telephone Co.

He is also survived by the following brothers and sisters: Mrs. Claud L. Clark of Topeka, Kas., and Mrs. Ed R. Hogg and Carol McHenry, both of Seattle, Wash. Another sister, Mrs. W. A. Moore, of Jefferson City, preceded him in death.

---

## Extends Line

Carl Betenbough, owner of the Andrews (Tex.) Telephone Co., stated that his company would soon have a line to Humble Camp completed. This connection will give the Camp two telephone lines. The Camp operates their own line, but with the completion of this line will give them connections outside their own lines.

---

Los Angeles' first telephone exchange was established fifty-five years ago, on February 1, 1881.

HOLTZER-CABOT
MAGNETO RINGING SET

- No Brushes
- One Rotating Element Only
- Nothing to Cause Radio Interference
- Close Voltage Regulation
- Designed for Exchanges up to 1500 Subscribers
- Will Run for Months Without Attention
- Minimum Maintenance Cost

WRITE FOR FULL INFORMATION

THE HOLTZER-CABOT ELECTRIC CO.
125 AMORY STREET, BOSTON, MASS.
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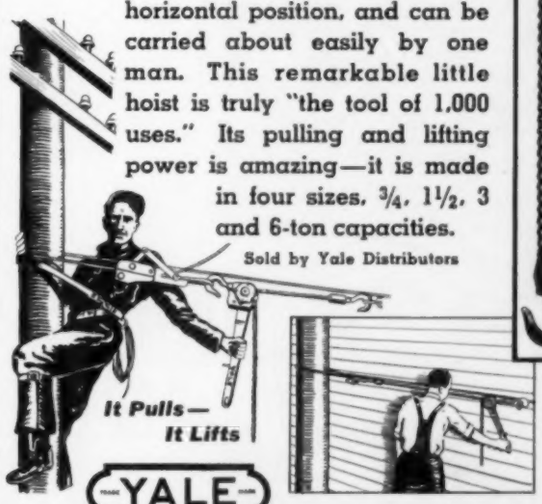
101 Park Avenue New York City, N.Y.
112 South 16th Street Philadelphia, Penna.

FOR THE TELEPHONE INDUSTRY

PUL-LIFT
The 'PIGMY' HOIST with a GIANT'S POWER

It operates either in vertical or horizontal position, and can be carried about easily by one man. This remarkable little hoist is truly "the tool of 1,000 uses." Its pulling and lifting power is amazing—it is made in four sizes, 3/4, 1 1/2, 3 and 6-ton capacities.

Sold by Yale Distributors




YALE

THE YALE & TOWNE MFG. CO.
PHILADELPHIA DIVISION • PHILADELPHIA, PA.

BETTER PLIERS

● Klein Pliers are made for the man who needs or appreciates a remarkably fine tool.

From the careful inspection of the alloy tool steel made to the most exacting specifications—

Through the old craftsman methods of individual manufacturing and individual heat treating—

To the final steps of rigid inspection and testing, each pair of pliers that carries the Klein trademark represents the maximum in plier quality.

Klein methods viewed in the light of modern mass production are necessarily more costly.

On the other hand, for a man who demands a plier of Klein quality there is no way to produce it except the Klein way.

Mathias KLEIN & Sons
3200 BELMONT AVENUE, CHICAGO, ILL.

## Independents Hold Record Breaking Convention

(Continued from page 32)

of procedures in connection with rural electrification.

A five-point plan for the basis of compensation to be paid Independent telephone companies for their participation in Bell System special services such as private line, short-period talking services, long-period talking service, teletypewriter exchange service and other special classifications, was presented by Mr. Pitcher. Major points in the committee's report were that the rate of compensation for special services shall not be less than the rate of commission for toll business, that fifty per cent of the entire revenue shall be considered in two-way point to point service when originating in each territory and that for TWX the "originating business" definition shall be the same as in the toll agreements.

The important committee report on Bell System special services embodied the summary of its views in the following five points:

"(1) In two-way point-to-point service, 50% of the entire revenue shall be considered as originating in each territory.

"(2) For short period and full period talking service, conference, multi-exchange, or other similar special services, the entire revenue for the service shall be divided equally among the exchanges involved and be considered originating business.

"(3) By the term 'entire revenue', as used in (1) and (2) is meant all charges for the service, excluding local loop rental and non-recurring items such as installation and move charges.

"(4) In teletypewriter exchange service, the definition of 'originating business' shall be the same as in the toll agreements in effect between the Independent company involved and the Bell company.

"(5) With 'originating business' as defined in (1), (2) and (4) as the basis, the rate of commission paid Independent companies in connection with these special services shall be not less than the rate of commission now received by those Independent companies in connection with toll business, and to that commission there shall be added a suitable allowance for equipment furnished by the Independent company; provided that in those cases where the commission on tolls is based on separate percentages of outgoing and incoming tolls the percentage to determine the commission on the special services shall be the percent the total commission received on such toll contracts is of the total originating tolls."

● The discussion on proceedures in connection with rural electrification projects was in charge of Secretary C. C. Deering. The main points involved in the discussion was whether or not the arrangements by which telephone companies sought compensation for any expense involved in making any changes in their lines due to the construction of REA projects, should be made by committees composed of telephone, REA, state commission, and power utility representatives or through state utility commissions. While in many states committees have been formed the latter method was recommended to Independent companies as the safest and legal procedure. The companies were urged to proceed in a legal manner through the commissions wherever compensation for damages became an issue.

● Twenty-one state associations were represented at the annual dinner and conference of state association executives the evening of October 13. Activities of the associations and the aid rendered to member companies as well as methods of solving problems confronting telephone companies were discussed at the meeting.

Accounting problems under state and federal systems; the application of Social Security legislation dealing with old age pensions and unemployment insurance; interference problems arising through rural electrification projects; new toll practices were leading subjects discussed in the Accounting, Commercial, Plan and Traffic conferences, held October 14 under the direction of Ranford Dunlap, W. N. McAnge, Jr., A. L. Staderman and C. C. Deering, respectively.

At conferences held October 15 the subjects of payroll accounting required by state and federal social security acts; present and future business conditions; new types of exchanges, new construction methods and up-to-date equipment and the training of operators and the turnover problem were discussed. The second day conferences were directed by C. E. Archer, H. F. McCulla, A. L. Staderman and R. S. Brewster.

The accounting conferences discussed mainly the "accounting for taxes" problems under the new Surplus Tax law and the accounting methods for the recording of payments under the Social Security Act. There was a concensus that the present situation on the tax measure presented one of the most difficult accounting problems for telephone carriers, probably necessitating rulings from the Internal Revenue Bureau on many new provisions of the statute. The confusion, now existing over both the new tax statute and the social security act, ap-

(Please turn to page 44)

# The MASTER Ringing Machine

## Will Do Your Ringing Better & Cheaper

NOTHING TO WEAR OUT

- No Moving Parts
- No Adjustments
- Economical
- No Radio Interference
- Produces a Powerful Ringing Current

Price $45.00

30 DAYS' FREE TRIAL
You Take No Risk

(Operates on 110 volts A. C.)

**SUB-CYCLE**

**LORAIN PRODUCTS CORPORATION,**
**Lorain, Ohio.**

Lorain Products Corporation is exclusive manufacturer for use and sale in United States. Address foreign inquiries to Automatic Electric Sales Co., Ltd., Chicago, Ill.
Sold By Leading Distributors

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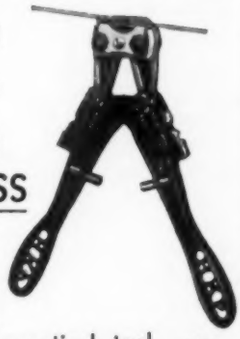
## NATIONAL ANNOUNCES---
## The NEW NICOPRESS TOOL

for making strong Air and Moisture-Proof Joints with NATIONAL NICOPRESS SPLICING SLEEVES



In making the ideal line joint, two things are vital, an efficient sleeve and a practical tool. There are no more efficient sleeves than NICOPRESS and the New NICOPRESS TOOL is unsurpassed for usability.
This tool is only 9¾" over all and weighs but two pounds. It is convenient to use, either in the air among the wires or on the ground and its lightness minimizes burden in belt and strain in making many splices. It is flexible, has plenty of pressure, is strong and any lineman will quickly master its use,—and the cost is low, but $5.50. Write today.

**THE NATIONAL TELEPHONE SUPPLY CO.**
5100 SUPERIOR AVE. CLEVELAND, OHIO

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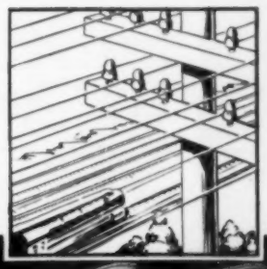
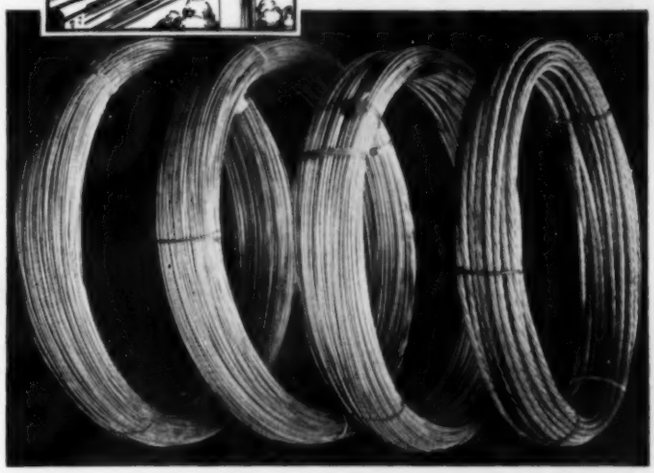
# IT'S THE *Hot Galvanizing* THAT INSURES BETTER SERVICE





THE modern hot process of galvanizing as developed by the American Steel & Wire Company and used on USS Perfected Telephone, Telegraph Wires and Strand, offers the utmost protection against corrosion and assures better service.

By this tried and tested method, properly treated wire is passed through a molten bath of pure, high grade zinc. The metals bond chemically to form a strong combination. When the wire leaves the bath, it carries an even and uniform coating that satisfies every service and laboratory requirement for ductility, strength and corrosion resistance. The hot galvanized coating will not flake, crack or disintegrate under the hardest of service conditions.

Millions of miles of USS Perfected Telephone, Telegraph Wires and Strand have gone into service because of their reliability.

## U·S·S PERFECTED
### *Telephone, Telegraph Wires & Strand*

AMERICAN STEEL & WIRE COMPANY

208 S. LaSalle St., Chicago Empire State Bldg., New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Products Company, New York, *Export Distributors*

**UNITED STATES STEEL**

*More Hours of Service*

. . . that's what every telephone engineer seeks . . . *more hours of service* . . . which means fewer replacements, lower service costs! And that's exactly what Ray-O-Vac telephone batteries offer!

For 3 decades Ray-O-Vac batteries have met and exceeded specifications and requirements on every recognized telephone and light intermittent test, and surpass all government standards. For lower service costs, specify Ray-O-Vac!

RAY-O-VAC COMPANY
Formerly FRENCH BATTERY COMPANY
MAIN OFFICES AND PLANT
MADISON, WISCONSIN
Additional Factories at
Clinton, Massachusetts and Lancaster, Ohio

## Value-of-the-service in Rate Making

(Continued from page 34)

comparisons can be made between classes of services for the domestic or individual use of electricity, gas, transportation, and communication, showing differential degrees of value of service.

In the same manner that we have gradations of value of service for individual consumption of utility services, we have varying degrees of value for industrial, business, and governmental consumption. While it is not the intention here to catalogue all of the uses of utility services in industry and government and assign a rank as measured by value of service, a further partial analysis of the consumption of electricity may be helpful.

Electricity used for light in industry is its highest function. In manufacturing where intricate operations are conducted it is necessary to have the best kind of light which is safe and powerful. Electricity fulfills that need best. Next, according to the degree of essentiality, may be placed its use in electrolytic processing. As a power agent, especially unit power, it performs a very essential function. It is often indispensable as a heat agent where processing requires careful control of temperatures.

● The life of a retail store, for instance, depends upon adequate lighting for its show windows, its signs, its interior and exterior. Similarly, sufficient street illumination is the life of a retail district, and part of such cost should be assessed against the retail outlets benefiting, because most of it is for display and not for protection. Few Americans desire to trade in a dark, dingy store or in a poorly lighted street. Electric illumination lends itself better to conduct retail merchandising than any other form of light known. This superiority also applies to theater lighting. In the medical services the light and diagnosis functions rank exceedingly high in value. In stores, offices, and shops where electricity is used for power it is with few exceptions secondary to lighting. While the importance of street railways is declining owing to the growth of the bus systems, the electric power which is used to propel street cars is of great importance.

Electricity has a wide range of applications in government use. For lighting streets and public grounds to afford a measure of police protection is probably its highest function. To operate and light traffic signals may be placed next in order, followed by light used in offices, yards, and shops. Electric power is a necessary use, but of a lower rank, although it is practically indispensable where high government buildings are maintained requiring elevator service and other power, and where bridges and other works are operated by power.

● From the foregoing analysis we may draw the conclusion that value of utility service has numerous gradations and is many-sided; that it is primarily subjective to the individual consumer, and both subjective and objective to the business and governmental user; that it may be direct and indirect in its effect; that it is potential and actual. Therefore, value of service is a generic term composed of many kinds of definite specific values of service.

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## "Tapping In" On Washington

(Continued from page 31)

phasized in these briefs that depreciation or amortization would be allowed on all transactions coming in the Acquisition Adjustment account which represented acual investment in property.

The government briefs upheld the power of the Communications Commission to prescribe a drastic revision of the telephone accounting system and stressed that the burden of proof about the illegality of the controverted provisions of the new system was upon the telephone companies. Until the system goes into effect and causes damage to the companies, it was held in these briefs that the courts had no authority to upset an administrative function of the FCC. The value of obtaining original cost records of telephone property was agreed upon by the government briefs as an aid to rate regulation and a number of alleged "writeups" in telephone acquisitions above original cost when such expenditures amounted to actual property investment.

• ● •

## *Important Jamestown, N.Y., Corp. Case on Alleged "Bell Control" . . .*

● An important "Bell control" case in connection with determination of FCC jurisdiction—that of the Jamestown, N. Y., Telephone Corporation—is to come before the FCC Chief Examiner for a hearing in Washington on Dec. 2. The Jamestown independent company denied vigorously that the New York Telephone Co. ever exerted any control over it because of the Bell company's stock interest and pointed out that it already is engaged in a toll division court controversy with the New York company. In many cases the Jamestown company claimed it had gone directly opposite in policies to those supported by the director-representatives of the New York Telephone Co. on its board. Paul D. P Spearman, former general counsel of the FCC, will represent the Jamestown company at the hearing.

# What an advertisement they could write ---if they could write!

THE life story of this super-tool, if related by itself, would make a far better advertisement than we could ever hope to write . . . a story of tough jobs encountered daily — and licked! . . . of efficiency in every operation involving cutting, pulling, twisting and stripping . . . of valuable time and labor saved . . . of dependability and speed in emergency line work . . . and lastly, of a long and colorful life, with unbelievable capacity for taking punishment.

But you can have this story in the actual performance of these pliers, by a simple running test made without risk of loss to yourself through our

**30-Day TRIAL OFFER**

Purchasing Agents: Write us today for particulars and prices.

FORGED STEEL PRODUCTS CO.
NEWPORT, PA.

**PROFESSIONAL LINEMAN PLIERS**

No. 58-R—8½" (Lineman's favorite)
No. 57-R—7"
No. 56-R—6"

Name electrically etched on handle of each pair—FREE

**Vacuum Grip Pliers**

BUILT UP TO A STANDARD — NOT DOWN TO A PRICE

OVER A MILLION IN USE

---

# BUILT TO "TAKE IT"

## THE YEAR 'ROUND

## IN HOT WEATHER OR ICY COLD

## OWENS-ILLINOIS

# HEMINGRAY

*Pin-Type Glass* **INSULATORS** *are OK for long life*

● There's no proving ground for insulators like actual service right up on the poles where nature can hammer away at them winter and summer with cold, heat, rain, frost, wind and snow. That's where Hemingray Insulators have proved they are unaffected by seasonal or sudden temperature changes. They are homogeneous in character with only one coefficient of expansion. Write us about your requirements. Owens-Illinois Glass Company, Structural Materials Division, Muncie, Ind.

OWENS-ILLINOIS Glass PRODUCTS

---

# 60,000 *electrical items for every* Telephone Need

In these days when everyone is looking for purchasing economies, Graybar's service of supplies makes economies possible . . . It brings 60,000 electrical items within arm's reach of the telephone user. Does away with "shopping" around. Eliminates expensive stocks . . . The natural result of Graybar's long experience in meeting the special needs of the telephone industry—an experience that goes back to the beginnings of that industry in America.

**GraybaR**

OFFICES IN 79 PRINCIPAL CITIES. EXECUTIVE OFFICES: GRAYBAR BLDG., N. Y.

YOU want a Strand that Lasts -and here it is.

Our Sparrow's Point plant is one of the few in America making only Strand and Guard Fence—a highly specialized organization whose aim is to produce a product of unusual merit.

*Send for special catalog.*

WILLIAMSPORT WIRE ROPE CO.

WILLIAMSPORT, PA.
122 SO. MICHIGAN AVE. CHICAGO
Offices in All Principal Cities
Joslyn Manufacturing & Supply Co.
20 N. WACKER DRIVE, CHICAGO, ILL.
National Distributors

## Independents Hold Record Breaking Convention

(Continued from page 40)

peared a keynote of the conferences' discussions.

The two days of round table conferences on telephone plant matters were given over the first day to discussion of rural electrification and the best methods of telephone companies protecting their properties and on the second day to the latest construction methods and types of exchanges and equipment.

Robert W. Wopat of the Iowa Continental Telephone Co. gave a survey of inductive interference in an excellent report, and stated that the new type of construction being used in rural electrification projects had presented difficult telephone problems. Citing that power distribution systems previously had been laid out in isolated systems or unigrounded, the rural electrification construction is called multi-grounded but in reality is merely a grounded power line. "With a grounded telephone line and a grounded power circuit," he said, "the chances of interference are great and the only remedy for the trouble is to metallize one of the lines and free it from the ground." He added that the telephone man cares more about the intensity of the interfering noise than the pitch and wants his line to be commercial and not on a border line basis.

J. W. Wopat, consulting engineer of Fort Wayne, Ind., discussed the tests which led to the decision of the Iowa state commission on multi-grounding of rural electrification systems which required power companies to remedy interference troubles and to make cost settlements with the telephone companies in advance of construction of the lines.

At the accounting conferences the status of the new uniform system of accounts of the Federal Communications Commission, now before the U. S. Supreme Court, was reviewed. The discussion of the system mainly revolved about the original cost principle and the depreciation allowances on constructed and segregated plant.

At a combined meeting of all the divisions on October 14, a demonstration entitled "Telephone Doors" was given by Miss Mildred Adams, voice instructress of the Lincoln (Neb.) Telephone and Telegraph Co.

---

Commercial telephone service between Great Britain and Ceylon has been inaugurated. The service is by radio telephone to British India and thence by land lines and submarine cable to Ceylon.

## New District Office

The Southwestern Associated Telephone Co. announces selection of Dalhart, Tex., as district headquarters for 10 other properties in Texas, Oklahoma and Kansas. F. A. Robinette, former Dalhart manager, was appointed district manager.

Three Way Mastergrip

- Mastergrip is **more economical** because at no greater initial cost, it is less expensive to install.
- Mastergrip **is easy to install** because it is light, compact, self-expanding; requires small or no hole and no expensive tools.
- Mastergrip has **power to hold** because it is expanded into undisturbed soil and is made of **Certified Malleable Iron** or its superior.
- Mastergrip is **light in weight**, which makes every operation easier.
- Mastergrip is dependable in swampy and sandy soils where it is difficult to dig a hole because Mastergrip can be **driven into place**, to any depth.
- Mastergrip **blades operate independently** allowing anchorage against buildings or walls or in rocky soil.
- Mastergrip can be **installed under water** and **set at any angle.**

*Descriptive Folder on Request*

THE AIKEN
MASTERGRIP
ANCHOR CO., INC.
63 E. Lake St. Chicago
114 N. 7th St. Saint Louis

## Thirteen Million Sales in Six Minutes

A sale amounting to $13,000,000 was recently completed in a six-minute transatlantic telephone call between New York and Stockholm. The Swedish Match Company in Stockholm bought nearly all of the foreign holdings of the International Match Corporation, located in New York.

Part of the price was paid in Stockholm, part in New York. Part of the documents, securities and releases representing the International Match Company's assets were delivered in Stockholm, part of them in New York. As the various phases of the deal were completed at each end of the line, they were reported to the other end.

The purpose of the final telephone conference was to permit the Stockholm company to hear the New York deliveries acknowledged in the familiar voice of its attorney here, and to permit the New York company to hear the Stockholm deliveries acknowledged in the familiar voice of its representative there.

## Reduce Rates In Covington, Ky.

The Citizens Telephone Co., Covington, Ky., has received permission from the Public Service Commission to reduce telephone rates in Butler, Falmouth, Glencoe, Thatcher, Independence, Warsaw and Williamstown. The reduction will be 50 cents a month on residence telephones, and was estimated to save subscribers $8,496 a year. The company also proposed to install two-party in place of existing four-party lines.

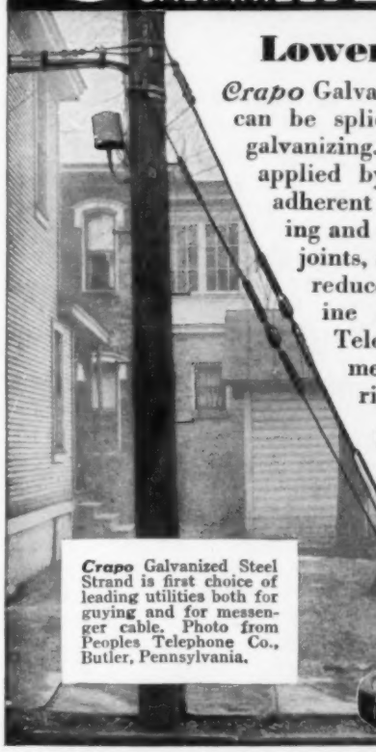
## Railway Express Features Telephone In Advertising

As a result of an advertising campaign stressing the use of the telephone in pickup service, the Railway Express Agency has enjoyed a substantial increase in this type of business in the larger towns throughout the territory.

An interesting assortment of pamphlets, blotters, mailing pieces, many with prominent illustrations of the telephone, bear such messages as these: "A 'Phone Call Starts It All!," "Pick Up Your 'Phone—and We Pick Up Your Package," and "Just Telephone—Our Truck Will Call for Your Shipment at Your Home or Place of Business."

In the Union Depot at Denver, for example, the Railway Express has a switchboard with ten trunks, seven incoming and three outgoing, 16 branches and three off-premise extensions. It is estimated the Company averages 380 telephone pickup calls daily.


Crapo
GALVANIZED PRODUCTS



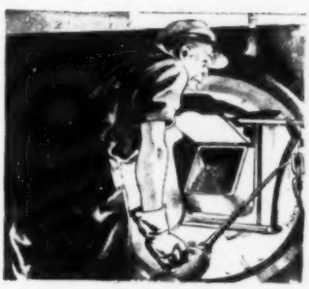
*Crapo* Galvanized Steel Strand is first choice of leading utilities both for guying and for messenger cable. Photo from Peoples Telephone Co., Butler, Pennsylvania.

**Lower Maintenance Costs**

*Crapo* Galvanized Telephone Wire and Steel Strand can be spliced and served without injury to the galvanizing. The heavy, uniform, *pure zinc* coating, applied by the *Crapo* Patented Process, is so adherent and so ductile that it defies sharp bending and twisting. This insures corrosion-resisting joints, adds to the life of the wire and actually reduces maintenance costs . . . . Specify genuine *Crapo* Galvanized Steel Strand and Telephone Wire for all new and replacement work! They more than meet the most rigid specifications. . . . .

**Indiana Steel & Wire Company**
**Muncie, - Indiana**

**Telephone Wire • • Steel Strand**



On the skilful check of the minutest details hangs life and death . . . **Protect against Tuberculosis by checking your health.**

BUY Christmas Seals 1936

The National, State and Local Tuberculosis Associations of the United States

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Illustrated are three of the Bartlett Tools for tree trimming. Special attention is called to the Bartlett No. 1-W Tree Trimmer with the compound lever. Has enormous cutting power; blades are crucible steel. It is a side cutting tool with a hardened hook. Available in any length from 6 to 16 ft. — in one piece or sectional poles.

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## Kilpatrick Elected Head of Telephone Pioneers

● The fifteenth annual meeting of the General Assembly of the Telephone Pioneers was held in New York, New York, on October 23 and 24.

At this meeting, J. L. Kilpatrick, president, New York Telephone Co., was elected president for the coming year, and Charles A. Stair, operating vice-president, Southern Bell Telephone and Telegraph Co., Atlanta, was elected senior vice-president. The other vice-presidents elected are: Gustaf L. Larson, general plant manager, Pacific Telephone and Telegraph Co., Seattle; Joseph D. Hathaway, vice-president, Northern Electric Co., Montreal, Canada; Clifford S. Merrick, manager, Western Electric Co., Philadelphia; Harry I. McCall, revenue accountant, Southwestern Bell Telephone Co., Dallas; and Miss Stella Feldhaus, pay roll supervisor, Cincinnati and Suburban Bell Telephone Co., Cincinnati.

The members of the executive committee elected to serve during 1937 and 1938 are: Horace G. Conger, vice-president, Northwestern Bell Telephone Co., Omaha; Leo Montamat, assistant vice-president, Bell Telephone Laboratories, New York City; and Richard F. Morris, safety supervisor, Mountain States Telephone and Telegraph Co., Denver. Members of the executive committee holding over from 1936 to the end of 1937 are: Edward V. Cox, assistant vice-president, American Telephone and Telegraph Co., New York City; and George L. Kelley, assistant superintendent of equipment installation, New England Telephone and Telegraph Co., Boston.

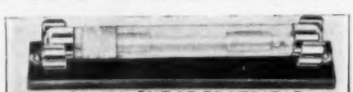
## Sells Interest In Texas Company

The sale by S. G. Smith of his interest in the Alpine (Tex.) Telephone Corp., to Harry H. Rogers, Tulsa, Okla., attorney, and others, has been announced.

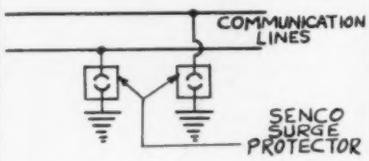
Mr. Smith, who has operated the exchange since 1921, will leave Alpine and devote his attention to property interests in El Paso, San Angelo, Graham, and Van Horn, Tex.

C. H. Jennings of Fabens will be the new manager of the company. He has been employed by the owners of the telephone exchange at Fabens for the last seven years.


**LINE PROTECTORS**



SENCO SURGE PROTECTOR

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The new type SENCO SURGE PROTECTORS and SENCO ARC SUPPRESSORS shunt out the induced surge without adding to load under normal operation. The action is entirely electronic, preventing failures due to wear and corrosion. Accurately predetermined breakdown for all weather conditions.

BULLETIN 1436 presents tables, oscillograms on modern surge protection and other interesting data. Write for it today.

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Only ONE Contact!
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(See our space in next month's issue)

## Holtzer-Cabot Announces New Motor Generator

Utilizing "Alnico", a new magnetic material, Holtzer-Cabot Electric Co. offers the telephone trade a magneto motor generator which for simplicity and ability to run long periods without attention is unsurpassed, the company states.

It consists of a two bearing frame with stationary windings for both motor and generator. This design makes possible the elimination of slip rings, brushes, circuit closing devices, and relays, it is said.

This machine is provided with wool packed oil return bearings. The bearing chambers, of ample capacity, packed with wool, hold a large supply of oil which is sufficient for long periods of operation.

Under the base of the set is mounted a capacitor of special design which enables the company to dispense with the use of slip rings and brushes to bring the motor up to speed, it is pointed out.

Motor and generator terminals are mounted on insulating blocks in recesses cast in the base which are used as junction boxes with facilities for direct conduit connection.

The Holtzer-Cabot Company states that the MG-125 ringing set is quiet operating, causes no interference with radio reception, and has close voltage regulation. Further, the generated voltage has a small 350 cycle component to give audible ringing. This can be reduced to any desired value by connecting a small condenser across the generator terminals.

## Washington Ranks First In Telephones

Washington, D. C. has chalked up a new high in talk—the largest number of telephones per capita of any city in the world.

A tally of office desks and home telephones stands 35.8 instruments for each 100 residents. San Francisco was running second with 35.08 per 100.

The growing complexities of governmental machinery paced the increasing use of phones. Within the last six years, installers of the instruments estimated, there had been an increase of 72 per cent in the number of telephones used by the Government in Washington.

The phone increase has paralleled in almost exactly the rise in the number of Government employees in Washington—from 68,510 on June 30, 1930, to 117,103 on June 30, 1936, according to Civil Service Commission figures.

The statistics are based on the 1935 figure of 189,017 telephones and a population estimated at 528,000 today.


Since the Earliest Days of this Century

WB

Thirty-five years of concentration on the problem of producing the best possible Telephone Wire. Thirty-five years of improving manufacturing methods, of checking and improving construction and materials. Thirty-five years under the acid test of actual use by hundreds of Telephone Companies throughout the world. When you buy Whitney Blake Telephone Wire you buy more than conductor and insulating material.

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COPPERWELD - BRONZE - COPPER
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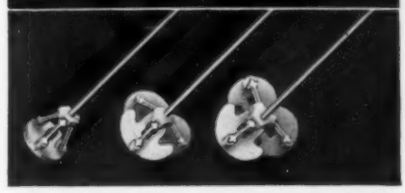
EASY TO INSTALL



EVERSTICK ANCHORS...

★ New construction is speeded up by the use of Everstick Anchors. This is also true of maintenance work. Ease of installation is the reason. Exclusive design permits the expanding *plates* of The Everstick to be forced into undisturbed earth quickly and easily. The finished guying job is one that will stand the strain of the most difficult service. Everstick Anchors and Pole Line Specialties are available for the heaviest construction as well as the lighter rural electrification lines.

Write for Bulletin No. 1134.

EVERSTICK ANCHOR COMPANY
FAIRFIELD, IOWA

New Testing Equipment

Shallcross precision instruments are important to the telephone man for accurate measurements in the telephone field.

Type 628
Fault Location Bridge

This instrument, in which simplicity of operation is an important factor, was designed for locating faults in cable such as grounds, opens, crosses or shorts, and inductive crosses or split pairs.

Send for Bulletin 628-N describing this new instrument.

SHALLCROSS MFG. CO.
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## New Portable Drawing Board Announced

● A new product which should be of interest to telephone engineers is the new Pretty Neat "brief case" size drawing board announced by H. E. Twomley, 7154 Magnolia Ave., Riverside, Calif.

The "Pretty Neat" drawing board weighs less than one pound and being only ¼ of an inch thick, takes up very little room in the brief case. Although compact it is extremely efficient, simple to operate, and complete in detail, requiring no thumb tacks or "T" square.

It is accurately and sturdily built of strong material for every day hard usage by engineers, draftsmen, designers, etc.

The success of this drawing board is due to the fact that the ends of the triangle guide strips which form the border of the board, and spring paper clamps are so formed that they elevate the corners of the triangle above the adjacent side, giving absolute freedom of movement of the triangle beyond the limits of the drawing board.

The spring paper clamps are lifted by pressure of the forefinger on small buttons provided on the back of the board.

An eight-inch 45 x 45 degree triangle is recommended, however other sizes will be found to be satisfactory.

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Plans have been completed for extensive development of the telephone service throughout Manchukuo. One of the projects contemplated is the construction of a telephone exchange at Dairen, while another exchange, with a capacity of 1,000 lines, will be built at Changchun.

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